

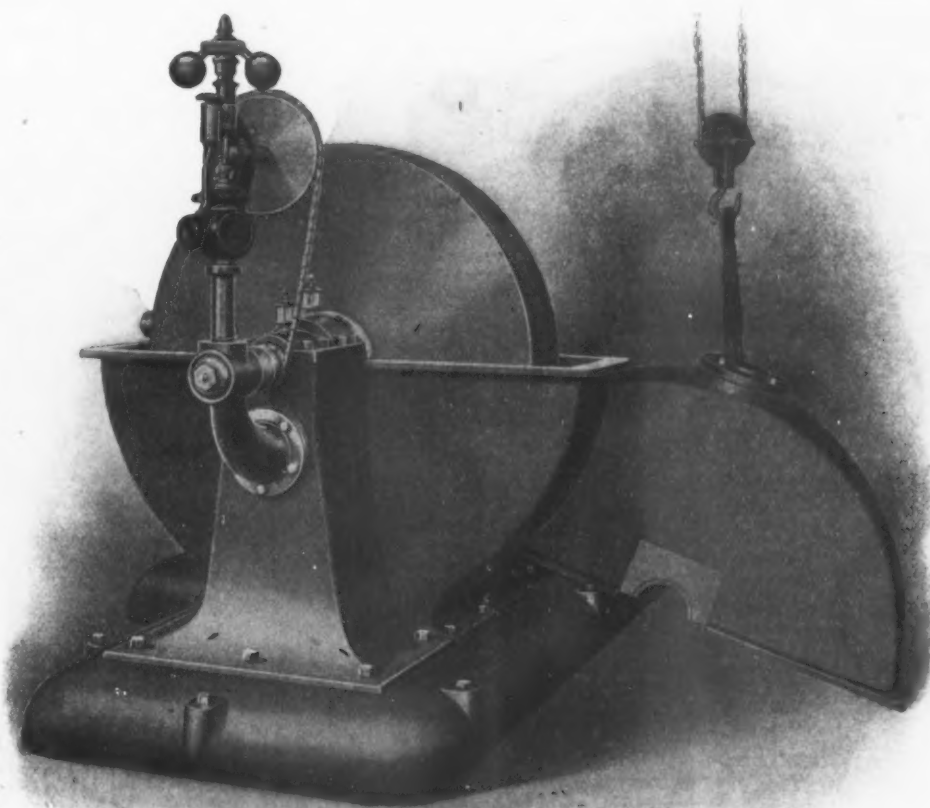
THE IRON AGE

THURSDAY, OCTOBER 30, 1902.

The Brady Steam Turbine.

A new steam turbine, which recent experiments have demonstrated to possess novel and valuable features, is being brought out by the John F. Brady Steam Turbine Company of 43-47 Fulton street, Chicago. The steam turbines now in service are, more or less, modified forms of the two principal devices first brought prominently before the world in the beginning of dynamics. These forms of turbines obtain their motive power mainly from the force of impact or from the impact and reaction of steam. The new type of turbine, however, while an engine of maximum simplicity, derives its motive power

Figs. 7, 8 and 10, with a shell; a shaft, two shaft sleeves and a double set of bearings. The central disk, Fig. 7, possesses expansion chambers on each face, while the two lateral disks, Fig. 8, have been formed with expansion chambers only on the faces presented to the central disk and so arranged that the walls of the latter expansion chambers revolve in the spaces between the walls of the expansion chambers on the central disk. The middle disk is bolted at the circumference crosswise to each lateral half of the shell, which incloses the three disks. Each shaft sleeve is continuous with its fellow lateral half of the shell and each sleeve embraces the shaft, occupying separate bearings from the shaft proper. In this ingenious manner the central disk is made to revolve



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from the expansive force of steam the same as does the reciprocating steam engine. A very high degree of efficiency is attained by this turbine, principally because of a unique system of expansion chambers, which are arranged in concentric circles from center to circumference of the wheel, and which are so placed that tangential steam passageways lead from one series into the next higher, the steam expanding successively and imparting its energy to oppositely revolving disks. The area of these chambers, of course, increases progressively, and they have been accurately designed to detain the steam in each succeeding series of chambers just about the length of time necessary to secure the best results at given speeds.

Features of Construction.

The essential features of construction are a turbine wheel, which is composed of a set, or nest, of three disks,

with the shell in one direction, while the two lateral disks are keyed at the center to and revolve with the shaft in the opposite direction. A cast iron jacket, Fig. 1, incloses the wheel, which is composed of the three disks and shell.

Steam is introduced into the turbine through an opening in the shaft, apertures giving entrance to the expansion chambers. The steam condenses in the space between the periphery of the wheel and the casing or jacket, and the water being free from oil and other impurities is pumped back into the boiler; no condenser is required. To concentrate the energy of the three disks and to secure motion in one direction, when desired, the usual method of gearing is resorted to. With the exception of the bearings no two parts touch and consequently no lubrication is required, except of the bearings, and no packing is needed anywhere.

Each disk is constructed from a solid piece of cast iron, faced and drilled for the expansion chambers, the tangential openings being made with a circular saw. In constructing the expansion chambers it is possible to secure accuracy within one to two-thousandths inch, although only $\frac{1}{8}$ inch clearance is required. Notwithstanding the very low cost of mechanical construction by the use of standard tools, the application of special tools, it is claimed, will reduce the expense about 75 per cent.

Conspicuous Advantages.

In common with other forms of steam turbines, but perhaps to a greater degree, it possesses conspicuous advantages over the reciprocating steam engine, prominent among them being simplicity of design, low first cost, small expense of installation, light cost of maintenance, small space occupied, and—there being no reciprocating parts and the motion being wholly rotary—an absence

B, and that each of these heads has an outwardly projecting sleeve, E. Both of these sleeves are mounted in bearings, D. The heads are peripherally connected by a perforated cylindrically shaped casing, C, which forms

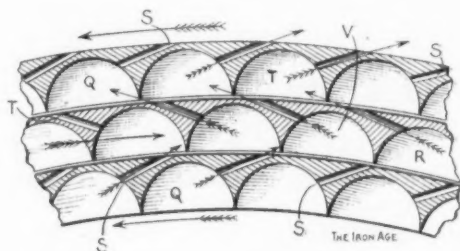


Fig. 2.—Section through Expansion Chambers and Steam Passages.

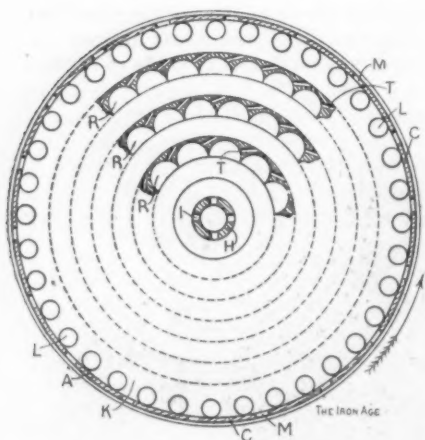


Fig. 3.

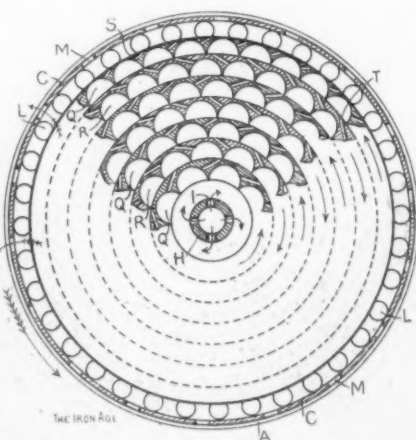


Fig. 4.

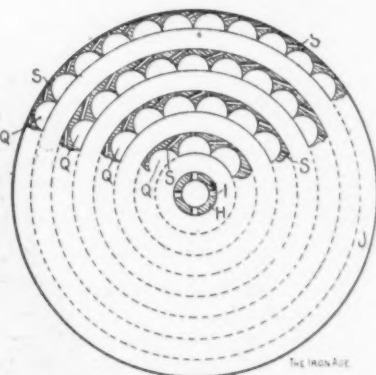


Fig. 5.

Face Views of Disks, Showing Expansion Chambers.

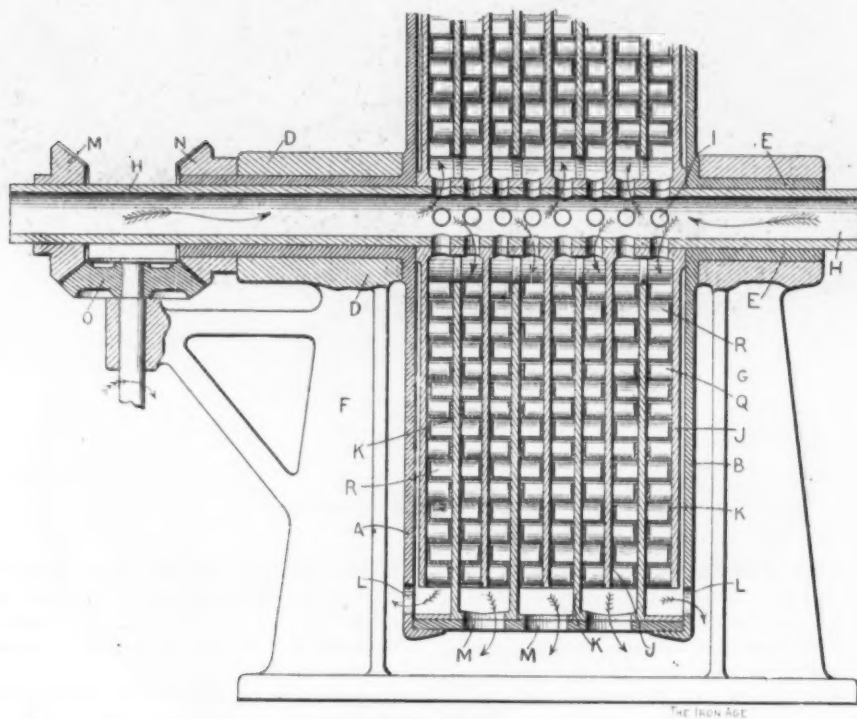


Fig. 6.—Axial Section of Turbine.

THE BRADY STEAM TURBINE.

of vibration, contributing in an eminent degree to durability.

The principles underlying the design will be readily understood from Figs. 2 to 6. Referring to Fig. 2 it will be seen that the turbine casing consists of two heads, A

the peripheral portion of the several disks K, which are attached to its inside surface. A hollow shaft, H, is mounted within the sleeves E, and attached to the shaft are the disks J, which are smaller in diameter than the casing C.

Projecting from the inside surface of the end disks J and from both sides of all the other disks, are several separate series of semicircular cavities or expansion chambers Q and R. The circular series of chambers are so spaced that the rows of chambers of one disk revolve between or at one side of the rows of the opposite or facing disk and in practically the same plane. Steam is admitted through the hollow shaft H, thence it passes outwardly through the perforations I into the open side of the first row, Q, of expansion chambers. It then flows alternately from expansion chambers Q into R and R into Q, through the tangential passageways T, finally escaping at the periphery through the openings L M.

steam inlet, the diameter of the turbine being 37 inches and the actual steam space in the engine 556 cubic inches. In these tests 13 pounds of water per horse-power hour were consumed, but these tests were entirely of an experimental nature and were made under many disadvantageous conditions. The performance of the turbine, however, under varying conditions has been such as to prompt the company to claim that under 200 pounds pressure, with 1-inch steam inlet the steam turbine wheel 10 feet in diameter, containing 62,000 expansion chambers, giving an actual steam space approximately of 16,000 cubic inches, will develop upward of 2500 horse-power. Such an engine is now being con-



Fig. 7.—Perspective View of Center Disk.

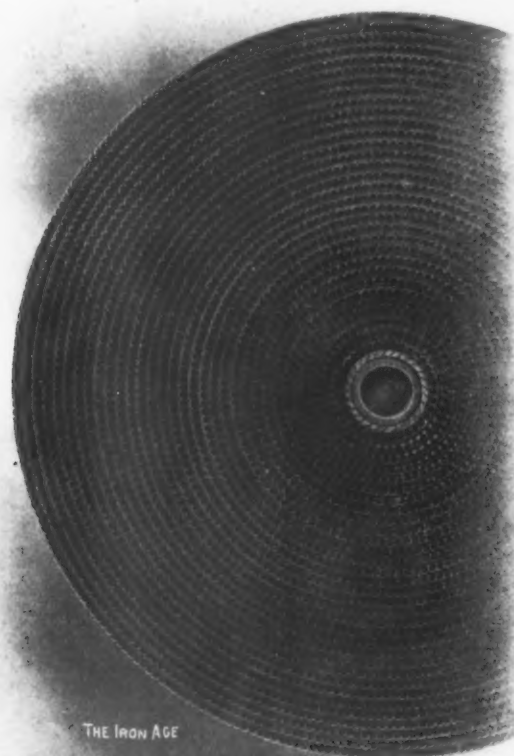


Fig. 8.—Side View of One Disk.

THE BRADY STEAM TURBINE.

The opposing disks revolve in opposite directions, which may be changed to motion in one direction by the bevel gears M, N and O, Fig. 6.

One of the most important features of the Brady turbine is that, while the same high speed of the turbine disks may be developed which makes steam turbines so desirable in generating electrical currents, the shaft makes but 212 revolutions per minute, but such command is secured by a mechanical device controlling the entrance of steam into the expansion chambers that it is possible to run at any speed desired, and any fraction of the capacity of the turbine may be utilized with the same relative degree of economy; the unused portion of the disks acting as a fly wheel. The ordinary form of fly-ball governor is used in regulation. The engine may be coupled direct and in many instances without the use of gears.

Tests of the Turbine.

Tests have been made with a 90 horse-power Brady steam turbine with 200 pounds pressure and $\frac{1}{2}$ -inch

constructed and a practical test will be made early in January.

The Common Council of Niagara Falls has just granted the Ontario Power Transmission Company a franchise in that city. This company are to handle power generated on the Canadian side at Niagara, and it is expected that their cables will enter the United States by way of one of the bridges or some other convenient means. While the power to be transmitted is to be generated in Canada, it is worthy of note that the feature of the franchise that actuated the Aldermen to grant the company rights was a clause under which the company agree to sell the first 1000 horse-power to the city of Niagara Falls for \$10 per horse-power. Despite its bountiful supply of electricity Niagara Falls now pays \$75 for each arc lamp in use on its streets, while incandescent lighting the people feel is also costly. That is, the public mind, taking into consideration the fact that Niagara has such a tremen-

dous supply of current, feels that the locality should enjoy lower rates on its public and private lighting service. A municipal lighting plant is proposed, and it would be strange indeed if a city so rich in power should have to depend upon the generating plant of another country for a lighting rate which the public would pronounce satisfactory. The work of the Ontario Power Company is progressing with considerable rapidity, and

siderable interest, especially among transportation men. W. Hamilton Wright is the inventor of the device that will be manufactured by the company, and he will be superintendent of the plant. The company have been capitalized at \$900,000.

The New Plant of the Alabama Steel & Wire Company.

BIRMINGHAM, ALA., October 26, 1902.—The question of the location of the new plant of the Alabama Steel & Wire Company has been settled, and, as stated in my letter of last week, the location is Gadsden. The decision will be a great disappointment to this district, for it means a loss of thousands of population and of thousands of dollars in disbursements. The site at Gadsden is half a mile wide and one and a half long. Operations will commence on the plant without delay. By January the company expect to have the railroad to their ore mines completed and to have their coke ovens in full operation. They will be ready to ship coal from their mines during the coming week. In the erection of the plant no grass will grow under their feet. The coal and coke for the new plant will be furnished from their mines near Bessemer, involving freight to Gadsden. Chattanooga lost the plant because of the lack of acceptable coal in proximity. The rod and wire mill plant now here will not for the present be disturbed. Its removal would involve an expenditure of \$200,000, and it will probably be a long time until it will be disturbed.

There is no disguising the fact that in losing this plant this district got a hard blow. But there was too much confidence in the belief that it was bound to come here, and possibly a lack of public interest was the result. There was an absence of hearty co-operation that

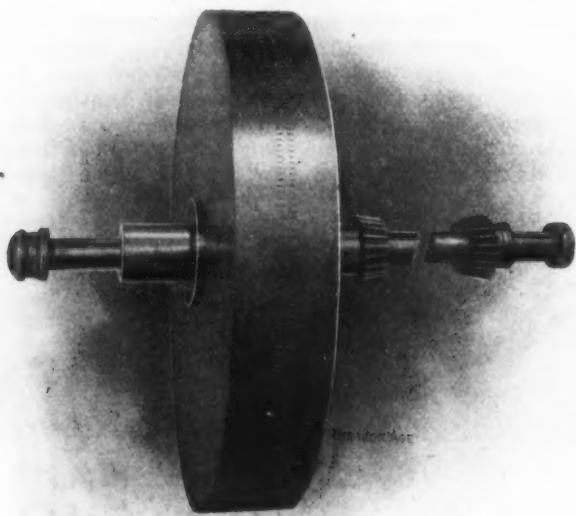


Fig. 9.—Turbine with Outer Case Removed.

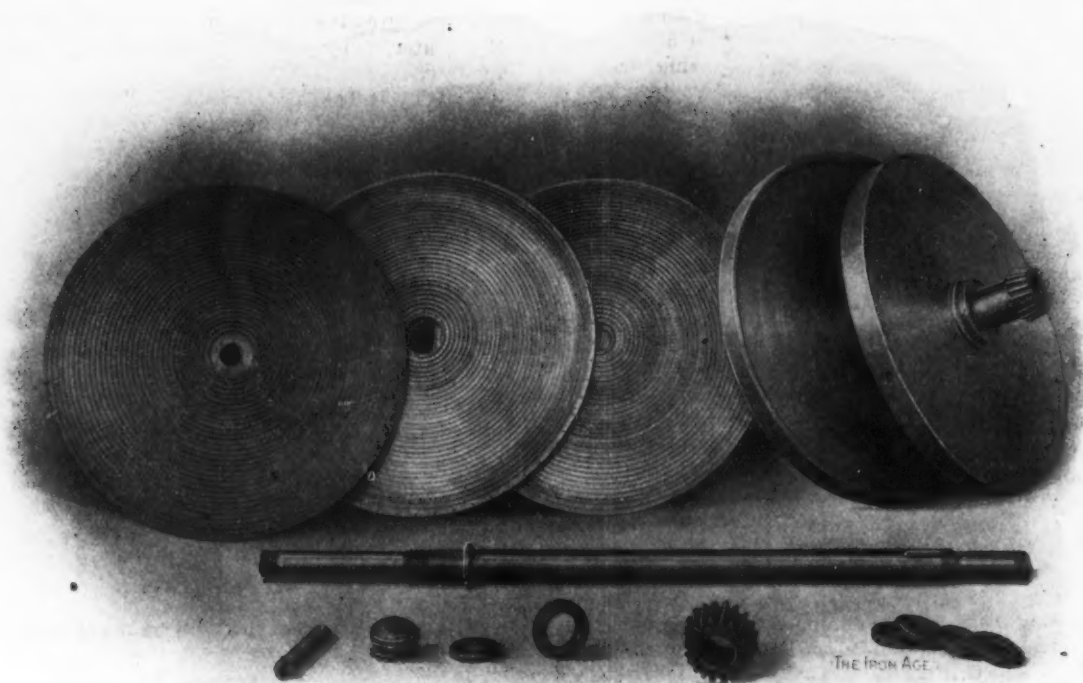


Fig. 10.—Parts of the Turbine.

THE BRADY STEAM TURBINE.

it is evident that the company is to be a factor in future Niagara power prices.

The Wright Taper Roller Bearing Company have broken ground on North Main street, Buffalo, adjoining the Erie Railroad tracks, for a new three-story, slow burning structure to cost \$30,000. It will be built in such a manner that it can be enlarged on the same foundation. The company's plans have aroused con-

was perhaps a factor in determining location, while Gadsden was liberal in the matter of inducements. It was millions to Gadsden. Her gain is our loss. We lose nothing we had. We simply failed to get what we might have had. It may draw attention away from us for a while, but we have too much of an impetus to make it cost more than a slight halt.

The reasons for selecting Gadsden for the location of the new plant are quite important. One of the reasons

given great weight is the abundance of water for steam and cooling purposes. The Coosa and Big Wills rivers at Gadsden are said to have a supply about equal to that of the Ohio. In a very short time water transportation to the Gulf will be available. Raw material can be assembled very cheaply. Other inducements which have not been made public are also stated by the company to have strongly influenced them in making their choice of a location.

The plans contemplate the erection of four blast furnaces and ten 50-ton basic open hearth furnaces with a blooming mill to take care of the steel production. At present, however, the company desire to get out as soon as possible a capacity that will supply their present Birmingham plant with steel billets. In order to accomplish this they have contracted for one blast furnace 20 x 90 feet and four hot blast stoves 20 x 90 feet. The lining of this furnace will be of Royal Star brick, manufactured by the Scioto Star Fire Brick Works of Portsmouth, Ohio. The iron and steel work of the furnace, stoves and hot and cold mains, as well as the incline, has been let to the Birmingham Boiler Works of Birmingham, Ala., and part of the material is ready for shipment at the present time.

The blowing engines are being built by the Southwark Foundry & Machine Company of Philadelphia, Pa. These engines were contracted for in April and are to be delivered in February, 1903. The company will use the Stewart patent cylinder car and have contracted with Caldwell & Watson of Birmingham, Ala., for four of them. They have given Heyl & Patterson of Pittsburgh, Pa., the order for the pig casting machine. This machine will be capable of handling 500 tons of metal per day. They will use the Crane hoisting engine built by the Otis Elevator Company of Pittsburgh, Pa., for elevating the raw material to the furnace. The construction of this furnace will be under the immediate charge of the furnace superintendent, J. J. Shannon.

In order to take care of the product of this furnace the company have placed contracts for four 50-ton basic open hearth steel furnaces, which are being designed by the Garrett-Cromwell Engineering Company of Cleveland, Ohio. These furnaces will be of the stationary type, and arranged in the most up to date manner, without using any new and untried devices, so that they feel certain of eliminating the difficulties which other steel makers have encountered in making steel in the South. They intend to use hot pig metal, which will be taken from the furnace to the steel plant in specially constructed ladles, which after reaching the open hearth building will be handled by a 40-ton Morgan electric crane. The charging of scrap material will be done by a separate and independent machine. On the pouring side the metal will be drawn into a 50-ton ladle to be furnished by the Cleveland Steam Boiler Works of Cleveland, Ohio, which will then be handled by a 75-ton Morgan electric crane. The gas for the entire plant will be generated in 22 Forter & Miller gas producers.

The open hearth building will be erected by the Riter-Conley Mfg. Company of Pittsburgh, Pa. The balance of the buildings will be erected by the Forest City Steel & Iron Company of Cleveland, Ohio. These consist of blooming mill, soaking pits building, boiler houses, gas producer houses, ingot stripper building, billet yard, structural material and other independent buildings; all of which will be of steel construction throughout. They have also purchased several hundred tons of structural material from A. M. Crane & Co. of Chicago, Ill., to be shipped from Germany. This shipment will come forward during the month of November. It was purchased there in order to get quick delivery. All the buildings have been designed to meet the conditions of the climate with the idea of obtaining the freest circulation of air.

After the ingot molds are filled they will be taken to an Aiken stripper and from there direct to the soaking pits, where they will be handled by a Morgan patent pit charging electric crane. This same crane will also take the ingot from the pit and deposit it in a car which will deliver it to the blooming mill tables.

The blooming mill will be the Frank-Kneeland 36-inch mill, but which has been specially strengthened and changed in several places for the company's benefit.

The same machinery builders, the United Engineering & Foundry Company, Pittsburgh, Pa., furnish all the approaches and manipulators, also the shears for cutting up the bloom. This mill will be driven by a pair of 48 x 60 inch direct connected engines built by the William Tod Company of Youngstown, Ohio. After the billets pass the blooming mill shear they will be carried by a conveyor to the yard. If desired to ship them, they will be handled in a large cradle by means of an electric crane which will dump the billets direct into cars for shipment without handling. If it is not desired to ship them, the billets will be carried on by this same conveyor direct to the reheating furnaces for the rod mill and then rolled into rods. Therefore all steel that is to be put into rods will never be allowed to become cold after the raw material once goes into the blast furnace until the rod is coiled.

The steam for the entire plant will be furnished by Stirling boilers manufactured by the Stirling Company of Barberton, Ohio. The scrap shears and roll lathe will be furnished by the United Engineering & Foundry Company of Pittsburgh, Pa. The yard locomotives are being built by E. K. Porter & Co. of Pittsburgh, Pa., while a locomotive crane is being built by the Brown Hoisting Machinery Company of Cleveland, Ohio.

J. M. K.

The Society of Naval Architects and Marine Engineers.

Following is a list of the papers to be read at the tenth general meeting of the Society of Naval Architects and Marine Engineers, to be held at 12 West Thirty-first street, New York, November 20 and 21:

Thursday, November 20.

1. "Technical Training for Shipbuilders," by Henry S. Pritchett, L.L.D.
2. "Progressive Trials of the Screw Ferry Boat 'Edgewater,'" by Edwin A. Stevens and Charles P. Paulding.
3. "Why It Takes So Long to Build and Equip a Naval Vessel for the United States," by George W. Dickie.
4. "The Preliminary Official Trial of the United States Battle Ship 'Maine,'" by Assistant Naval Constructor J. W. Powell, U. S. N.
5. "The Water Tube Boiler in the American Mercantile Marine," by Wm. A. Fairburn.
6. "Longitudinal Bending Stress on Damaged Ships," by George C. Cook.
7. "Some Problems on the Surfaces of Buoyancy and of Water Lines," by Prof. Cecil H. Peabody.
8. "Experiments and Formulæ on the Strength of Ships' Beams," by K. G. Medahl, Naval Architect, Germany.

Friday, November 21.

9. "Vibration of Steamships With Special Reference to Those of the Second and Higher Periods," by Rear-Admiral George W. Melville, Engineer-in-Chief, U. S. N.
10. "The Development of Modern Ordnance and Armor in the United States," by Rear-Admiral Charles O'Neil, Chief of the Bureau of Ordnance, U. S. N.
11. "Remarks on the New Designs for Naval Vessels," by Rear-Admiral Francis T. Bowles, Chief Constructor, U. S. N.
12. "The Tactics of the Gun," by Lieutenant-Commander Albert P. Niblack, U. S. N.
13. "The Possible and Probable Future Developments in the Use of Electricity on Board Ships," by F. O. Blackwell.
14. "Submarine Boats, Their Present Development and Future Possibilities in Naval Warfare," by Lawrence Y. Spear.
15. "Measurement Rules for Yachts With Special Reference to Racing Conditions," by F. W. Belknap.
16. "Prize Competition Paper."

Through inadvertence the name of Eames appeared in the advertisement of the Belmer Machine Tool Company, published in the issue of *The Iron Age* for October 16. The gentleman referred to is no longer connected with the firm in question.

A Strike Settlement.

The prolonged and obstinate strike of the puddlers and rolling mill men employed at the Lebanon Works of the American Iron & Steel Mfg. Company, which began May 5 last, was settled Saturday, October 18, to the satisfaction of both parties. The men have returned to work, and the mills are now in full operation. When they struck the men demanded higher rates than were paid by neighboring bar mills in the same line of trade, and lost remunerative employment for nearly six months, and returned to work without having gained any advantage, while the company lost much valuable trade during the same period and gained nothing except the satisfaction of maintaining a principle. At the Reading Works of the same company the rolling mill men struck May 13 last without any particular reason other than that it seemed to be the fashion, and after a few weeks new men were employed in their places and the old men have since been seeking employment elsewhere, and meantime the works have been running full. All this emphasizes for the thousandth time the extreme folly of strikes.

During this interval of nearly six months at the Lebanon plants important improvements begun nearly a year ago have been completed, and the works are now in first-class condition in all respects. The company have added new buildings, covering more than 3 acres of ground, some of them taking the place of old and inconvenient structures, and have equipped them with new and modern facilities, improved the several trains

New Plant of the Continental Bolt & Iron Company.

The Continental Bolt & Iron Company are now in full operation at their new plant at Union and Twenty-second streets, Chicago, having moved from the old buildings a few months since. The new building, which is of steel and brick construction, is 125 x 300 feet and

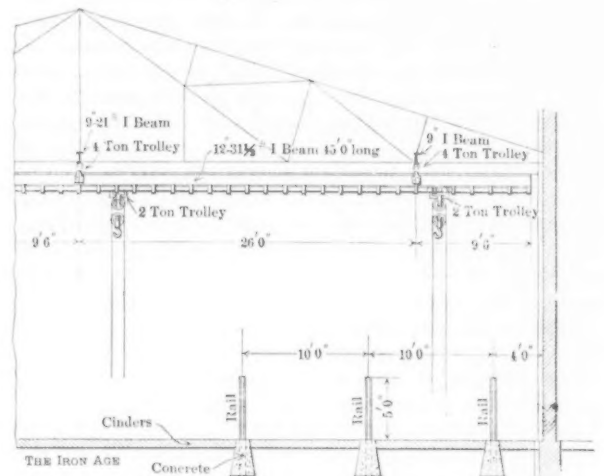
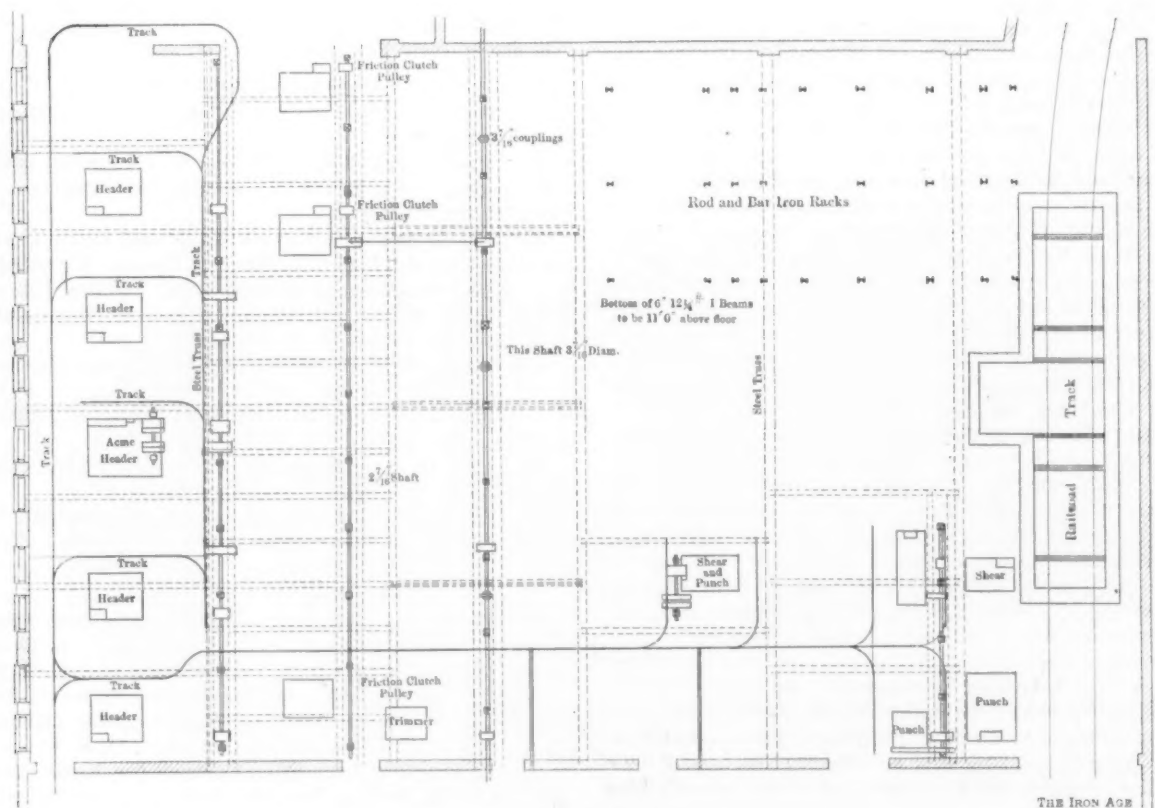


Fig. 2.—Cross Section of Heading Room.



Heading Room.

NEW PLANT OF THE CONTINENTAL BOLT & IRON COMPANY.

of rolls, added new machinery, engines, boilers, furnaces and an electric power plant and other things, so that the present capacity of production has been greatly increased and the facilities are much better than ever before.

The Terlingua Quicksilver Deposits of Brewster County is the title of a monograph by Dr. W. B. Phillips of Austin, Texas, Professor of Field and Economic Geology of the University of Texas and Director of the Survey.

embraces the following departments, systematically arranged to obtain the best results in handling the raw material and the manufactured products: Heading room, threading room, stock room, blacksmith shop, engine and boiler room and office.

The heading room, which is provided with a cinder floor at grade, is 75 x 120 feet and 22 feet in height in the clear. The threading room, Fig. 3, which is 2 feet above grade, is 75 x 120 feet, 16 feet in height in the clear. The stock room is 4 feet above grade, 100 feet square and 14 feet in height in the clear. The blacksmith shop

and engine and boiler rooms, Fig. 5, are each 50 feet square and 22 feet in height. The boiler room has a space of 20 x 50 feet set aside for coal, the capacity being 10 carloads.

In designing the buildings special care has been taken to provide the maximum amount of light by means of skylights, in addition to the ordinary side windows. In the heading room is a skylight 20 x 120 feet. In the threading room are six skylights and in the stock room four skylights, each 8 x 12 feet. The blacksmith shop, engine and boiler rooms are lighted by a Texas skylight, 20 x 50 feet. The threading room and stock room have, as stated, been placed above grade to facilitate the loading and unloading of cars and wagons. A spur has been run from the Chicago, Burlington & Quincy Railway into the property and enters the building on the south side, where the material can be loaded or unloaded under cover.

In the heading room is a 4-ton hand power travel-

fit, as well as shears, punches, bolt heading machines and bolt and nut threading machines run by steam power generated by a Corliss engine of 200 horse-power. The entire plant is heated by steam, exhaust and live, and wired for both arc and incandescent electric light. The boilers are of the John Mohr water arch pattern, with the furnaces designed especially to prevent the generation of smoke. A contract has just been placed with the Dodge Mfg. Company, Mishawaka, Ind., for a steam power car puller provided with a rope take-up, having a capacity of pulling five loaded cars simultaneously. The crane and trolley system used was manufactured and installed by the Wilcox Mfg. Company of Aurora, Ill. The plans were prepared by and the work executed under the direction of W. L. Stebbins, engineer.

The Newberry Charcoal Furnace.—The charcoal iron furnace at Newberry, Mich., which has been idle for

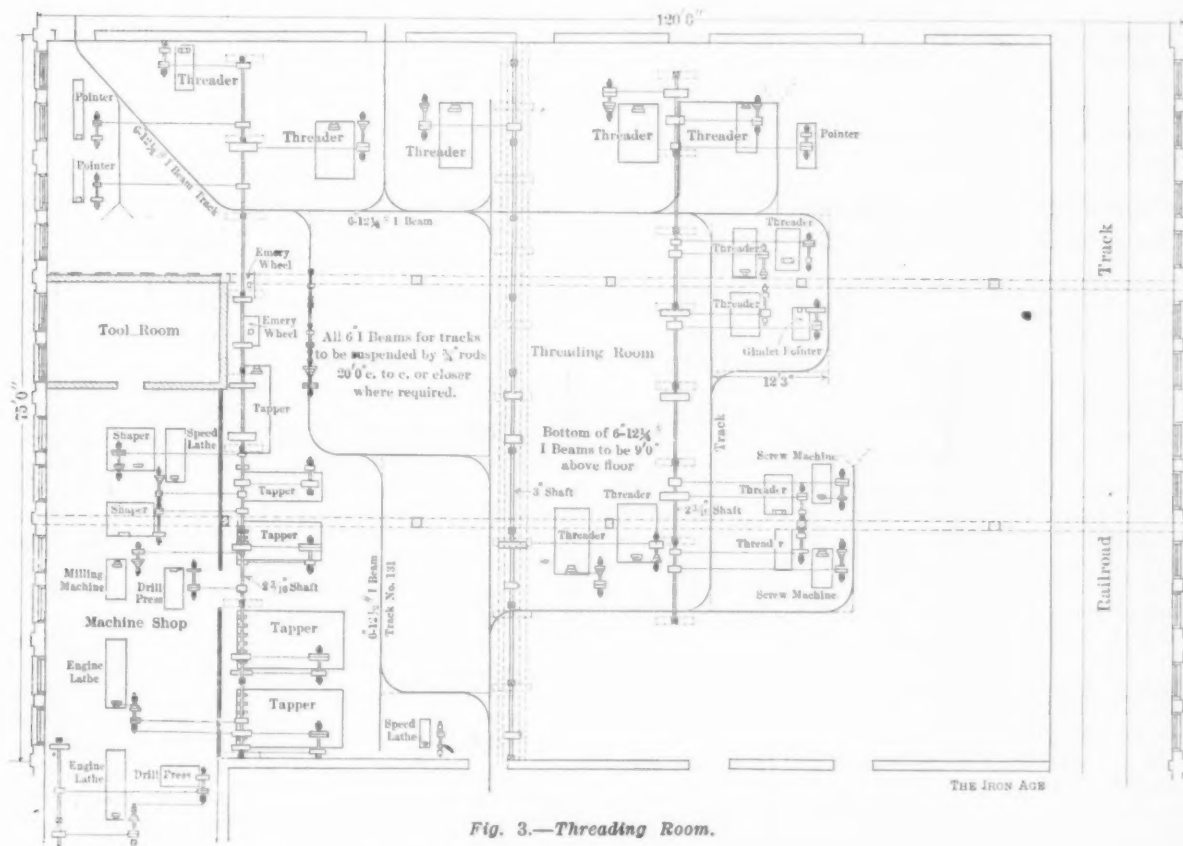


Fig. 3.—Threading Room.

NEW PLANT OF THE CONTINENTAL BOLT & IRON COMPANY.

ing crane, Fig. 4, provided with antifriction rollers and two grabs which pick up the rods in the car and deliver the various sized rods to the different sections provided for each size. One of the most important features is an overhead trolley system which extends throughout the various departments for the rapid and easy handling of the material in its different stages of manufacture, and the various machines are so arranged that the rods, bolts, &c., are constantly traveling in one direction until the finished material is ready for shipment. From the trolley are suspended skips, each having a capacity of 1 ton, into which are loaded the bolts. Antifriction rollers allow free movement through hand power. Thirty of these skips are already in use and 50 more are being installed.

The use of these devices for the economical handling of material has already resulted in a considerable saving to the company. This is readily apparent when it is known that the handling of material during the past two months has cost but 10 cents per ton, against a cost of 90 cents per ton at the old plant, and this has been accomplished with an expenditure of 40 per cent. less power and a slight reduction in the labor force.

The plant is equipped with a full machine shop out-

nearly eight years, has been sold, and preparations are now actively being made to put the furnace into prime condition. It is expected that the blast will be put on about February 1, next year. Those interested in the furnace plant are Berry Bros. of Detroit; W. G. Sharpe of Elyria, Ohio; R. H. Jenney of Pontiac, and E. J. Burrill of Manistique. The new company have purchased 16,000 acres of timber land, and have an option on 16,000 additional acres north of Newberry. A branch railroad is to be built to facilitate the transportation of the fuel. A contract has been awarded to C. H. Peterson of Traverse City to build a battery of 40 charcoal kilns, which will each have a capacity of 85 cords, being twice that of the old kilns. A contract has been awarded to Kimball & Keerf for cutting the timber and delivering the wood. A plant for the manufacture of wood alcohol will also be erected, but work on the chemical plant will not begin until next spring.

Lukens Iron & Steel Company announce the removal of their Boston office to the Board of Trade Building, 131 State street, rooms 1007 and 1008. They expect to be at their new location about November 1.

Canadian News.

Mr. Tarte's Resignation.

TORONTO, October 25, 1902.—The hopes of increased protection that were raised by the public utterances of Hon. J. I. Tarte have been somewhat dashed by the enforced resignation of that minister. Sir Wilfrid Laurier's first business on his return from Europe was to deal with the complaints of other members of the Cabinet against the Minister of Public Works. It is stated that the members of the Government representing Ontario, the Northwest and British Columbia signified to the Premier that unless Mr. Tarte stepped out they would all give up their portfolios. This report showing how extremely obnoxious Mr. Tarte's course was to the majority of his colleagues was taken by the manufacturing interests as an additional ill omen for protection.

Whatever the Government may ultimately do with the tariff, it must be said that there is nothing in Sir Wilfrid Laurier's letter dismissing Mr. Tarte to indicate its stand on the subject of the duties. The Premier was careful not to put himself on record as disapproving the protection theory, as advocated by Mr.

that Mr. Fielding was one of the most thorough going free trade advocates while in opposition, this statement cannot be taken as encouraging for protection. At the same time it is to be remembered that Mr. Fielding has allowed his theory to be modified by practical conditions. In his own province of Nova Scotia there are great coal fields and important iron and steel works. These he has dealt with liberally by continuing, with some variation, the protection they enjoyed under the Conservative Government. To be sure, he decided that the iron and steel bounties must be scaled down until they reach the vanishing point less than five years hence. It is thought, however, that if at any time the state of the iron and steel industry calls for further measures in its behalf he will consider its needs.

Cramp Steel Company's Works.

It is expected that the open hearth plant and finishing mill of the Cramp Steel Company at Collingwood will be running early in December. Bad weather during a great part of the building season retarded operations or the works would have been going now. Several weeks ago the machine shop was completed, and it is now kept at work upon portions of the outfit. This shop, along

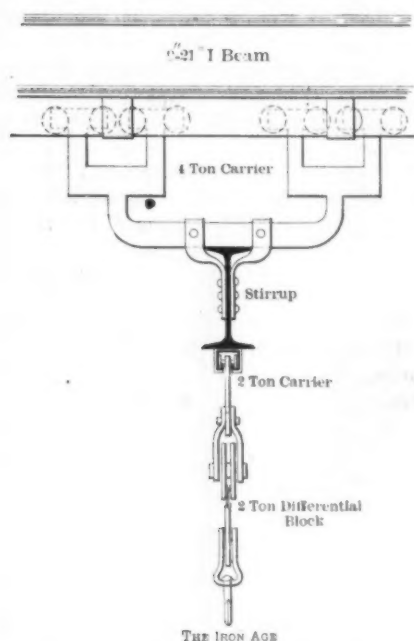


Fig. 4.—Detail of I Beam Crane.

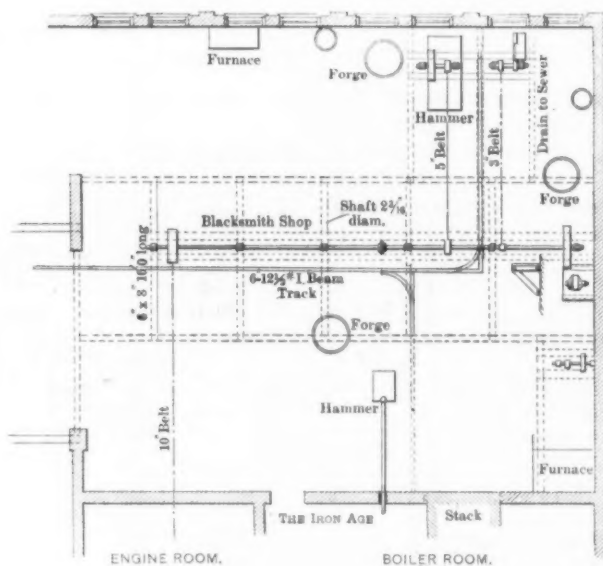


Fig. 5.—Blacksmith Shop, Boiler and Engine Rooms.

NEW PLANT OF THE CONTINENTAL BOLT & IRON COMPANY.

Tarte. To do so would have driven from his side not Mr. Tarte alone, but also the anti-free trade Liberals who applauded Mr. Tarte's speeches. So Sir Wilfrid left the question of trade policy on one side, neither condemning nor accepting Mr. Tarte's views on that subject, and disciplined him for proceeding in an irregular manner, contrary to constitutional usage and the principles of responsible government. Mr. Tarte was dismissed, not avowedly because he held opinions antagonistic to those of his chief, but because he expressed those opinions before they had been discussed and adopted by the members of the Government as a whole.

While it is undoubtedly good party tactics for the Premier thus to avoid even the appearance of rejecting a trade policy that is very popular, there can be no question in the minds of most people that the Minister of Public Works would not have been turned out of office had the views he advocated been such as they would concur in. Those who interpret Mr. Tarte's expulsion as a notice that there will be no increase in protection have probably the right understanding of it. At the last session of Parliament the Minister of Finance announced that when the time came for a revision of the tariff it would be dealt with, not in the interests of any particular class, but of the whole country. Seeing

with the forge and power works, is in a stone building 75 x 140 feet. The stone in it came from the company's own limestone quarries. The merchant bar mill building is 120 x 210 feet. Here the plant is being installed for the rolling mills and heating furnaces, where the steel ingots will be turned into the finished article. A 10-inch guide mill of modern design is ready for operation. It will handle 4 x 4 inch material, rolling it into flats, rounds and square down to 1/4 inch thick. The hot beds for cooling are 200 feet long. Two large power shears will cut the finished bars into the required length. In the east end of the same building a 20-inch mill is being set up. In this will be rolled ingots 8 x 8 inches and 4 feet long into billets for the 10-inch mill. Ingots not required for the 10-inch mill will be finished into larger sizes, such as 4 x 4 angles, shafting, small girders, street railway rails, mine rails, &c. This mill will be driven by a 600 horse-power Corliss engine of Canadian make. On each side of the building are large furnaces for heating the ingots.

The open hearth building is of steel. Within it the foundations for the open hearth furnaces are completed. There are to be two 20-ton furnaces of modern type, known as the straight line tapping furnaces.

A considerable part of the output of the works is ex-

pected to be used by the Collingwood Shipbuilding Company.

In the township of Lonut in the Parry Sound district the company have ore properties that appear to be promising. Operations for development were begun as early as May, 1901. The ore is of the magnetic variety.

Looking for Coal in Ontario.

The scarcity of coal caused by the Pennsylvania strike has given a stimulus to a search for coal in Ontario. In the vicinity of Chelmsford, 20 miles northwest of Sudbury, a deposit of carboniferous material attracted attention some years ago, but a Provincial geologist who examined it pronounced it not anthracite but anthraxalite. However, it was used for fuel by settlers and was found satisfactory, though the residue of ashes was large. Within the last few weeks a German geologist connected with one of the nickel companies operating in Algoma has examined it and now pronounces it genuine anthracite. Picked pieces, it is said, have shown to contain 95 per cent. of fixed carbon, and portions mixed with quartz have yielded 65 per cent. As far as observed the outcroppings increase in extent. Some Pennsylvania men, described as experts, say the slate found in apposition to the coal is of the same quality as that present in the Pennsylvania mines. The fact that the first excitement over the deposit—when it was discovered six years ago—was quenched by the authoritative pronouncement that it was not true coal, does not discourage the present interest in it. As Ontario has so far been unproductive of coal, any considerable body of it found amid such metallic mineral wealth as lies in Algoma would be of great moment.

To Aid Shipbuilders.

One of the points for which the shipbuilding interests of Canada have been pressing petitions upon the Government has at last been conceded. This is the closing of the Canadian coasting trade against foreign built vessels whose only title to engage in it is a British register. Heretofore vessels, no matter in what non-British country built, were free to carry between Canadian ports if they were registered in the United Kingdom. Vessels that have been admitted on that ground are to continue in the enjoyment of the privilege, but the right is not to be extended to other vessels. Foreign built vessels of British register, not already in the coasting trade, can now enter it only by paying the vessel duty provided for in the tariff. An act to this effect was passed at the last session of the Dominion Parliament, but as it affected Imperial powers it was referred to the British Government before being put into force. The British Government has not felt that it could properly object to it, and has so signified to the Ottawa authorities. Hence the act has been duly brought into force by proclamation.

A few years ago an American built vessel obtained a provisional British register from the British Consul at Chicago, and with this warrant proceeded to take part in the coasting trade of Canada. She was seized for customs duty, and after varying results in the courts, the case is still pending. A more frequent practice is to have vessels of non-British origin registered in the nearest British colony outside of Canada—that is, in Newfoundland—and upon the strength of that authority to ply between Canadian ports. By this procedure many of the vessels carrying coal between Nova Scotia and ports on the St. Lawrence got their status in that traffic. By putting an end to this mode of adding to the capacity of the domestic marine the act benefits Canadian ship builders.

C. A. C. J.

The Curtis-Crippen Engineering Company, selling agents of the De Laval steam turbines, have opened an office in the Monadnock Block, Chicago. The Curtis-Crippen Company, who contract for complete installations, also have offices at New York and Denver. L. F. Mahler is the Western district manager. Mr. Mahler also represents the New York Electric Headlight & Train Lighting Company, who utilize the De Laval system at Chicago.

Central Pennsylvania News

HARRISBURG, PA., October 25, 1902.—The industries of this city and Central Pennsylvania are still clamoring for coal and coke, especially the latter, which is scarcer in this district at present than at any time since the beginning of the strike in the hard coal regions. At the works of the Pennsylvania Steel Company, Steelton, every department reports a curtailed output on account of a lack of coke. At times there was scarcely enough fuel on hand to keep the blast furnaces banked. A supply is expected next week. Ore in quantities has been received during the week, and there is considerable soft coal on hand. The Chesapeake Nail Works were expected to resume operations October 20, after a week's shut down on account of having no coal, but the prospects are that they will be idle for a week longer. The mills of the Central Iron & Steel Company, which were closed for a short time because of lack of fuel, have resumed, and worked full time this week, with the exception of time required to repair a serious break down in Mill No. 2.

The furnaces of the Pennsylvania Steel Company at Lebanon have been banked during the past week on account of fuel shortage.

The Aurora furnaces at Wrightsville resumed operations October 20, after a shut down of one week. A large supply of coke has arrived and no further trouble is anticipated.

The Carbon Steel Casting Company of Lancaster have received a supply of coal, and will be able to operate regularly.

President E. C. Felton of the Pennsylvania Steel Company has been elected head of the Cornwall & Lebanon Railroad Company, whose line taps the Cornwall Mines lately purchased by the steel company.

At a meeting of the directors of the Eastern Steel Company in Pottsville, W. H. Gibbons, formerly president of the Parkesburg Iron Company, was elected president of the Eastern Steel Company. It was decided that, providing the borough of Pottsville took favorable action on an ordinance permitting tracks on a street adjoining the plant, the company would immediately proceed to erect four 50-ton open hearth furnaces instead of two, as originally proposed. The Eastern Company are trying to secure the redemption of pledges of citizens of Pottsville, made when the company established their plant at that place.

The situation at the Gelser Mfg. Company's shops in Waynesboro has remained unchanged for two weeks. There are indications, however, that the lockout of the machinists will be broken in a short time. Work has become congested, and both officials and machinists are willing to make some concessions. Some of the workmen have been offered positions at shops in Kenova, W. Va. The Frick Company, who took down their lockout notice last week, are settling their differences with the workmen as individuals. In case of failure to settle with the individual the company will recognize a committee from the shop.

The Smith Mfg. Company of Waynesboro have received orders for 10,000 feet of iron fence for a park near Fort Hamilton, N. Y. The contract price is \$13,000, and the delivery is to be made in four months. Orders are on hand to keep the works running on full time until the end of the year. Orders for six steel burglar proof cells for the Cumberland, Md., Jail have just been completed, and a delivery has been made of a large amount of structural iron work for the W. H. Helston Mill Construction Company. The company have built 1000 feet of bridge railing for the University of West Virginia, and fence for the Glenwood Cemetery in Massachusetts and markers for the Congressional Cemetery at Washington.

The Harrisburg Foundry & Machine Company will build three electric generators for the power plant of the Mississippi State Capitol at Jackson, and plans for the 300 horse-power and one 200 horse-power engines have been started. The company have also taken orders for the new electrical equipment of the Hotel Majestic in Manhattan, and a 500 horse-power engine for the new plant of the Eastern Steel Company at Pottsville.

The Harrisburg Pipe & Pipe Bending Works have

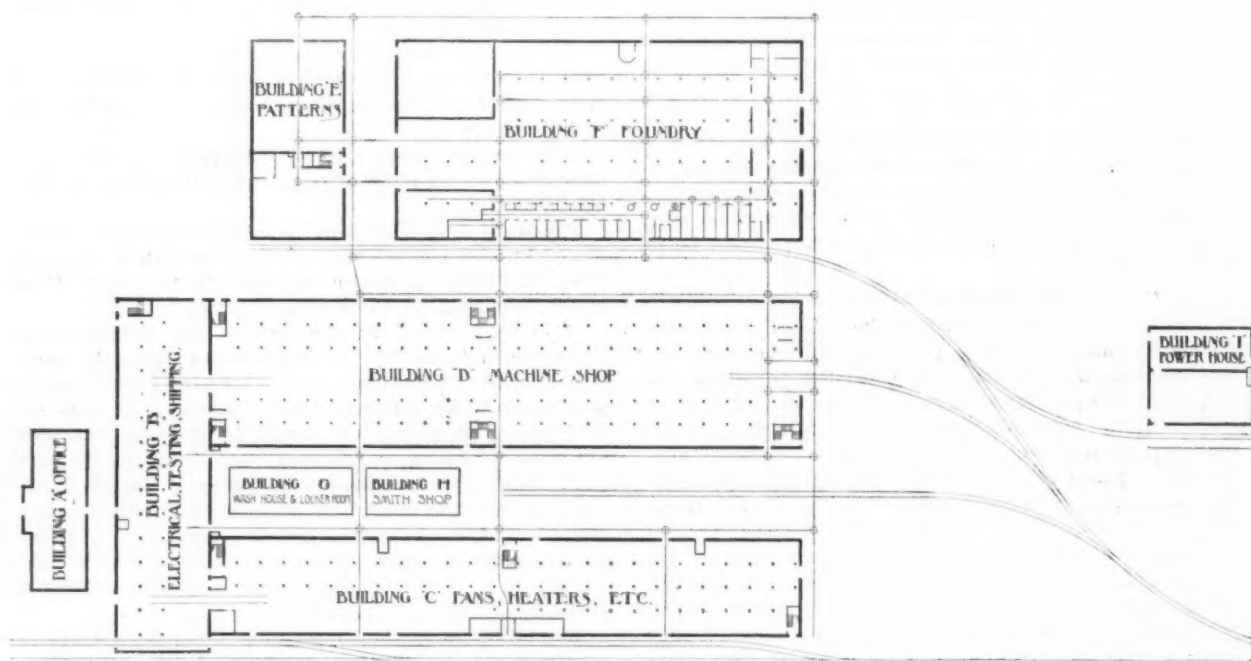
three new buildings in the course of construction, all of which are ready for roofing. Work is being rushed on the new galvanizing department, the old having been destroyed by fire some weeks ago.

New Works of B. F. Sturtevant Company.

The new works of the B. F. Sturtevant Company, now nearing completion at Hyde Park, Mass., present an excellent opportunity for studying the factors that control in the location and design of the modern manufacturing plant. The present plant at Jamaica Plain, Mass., is limited in its opportunity for growth, its capacity has long been strained to the utmost, and, as a consequence, the question of removal has continued to present itself with ever increasing force. The fire which occurred last year forced an immediate solution, and a new site was selected after the most careful consideration. Aside from the general character of the lot itself the principal factors considered in reaching a decision were proximity to raw materials and to an abundance of skilled labor,

the head of each department was consulted, his recommendations reduced to writing, and frequent conferences were held as to the requirements of the individual departments. With these data at hand the individual and aggregate areas were determined and the plans started with the idea of providing a total floor space slightly more than double that of the present plant. Consideration was first given to the question of the number of floors to be provided in the various buildings. The lay of the land and its available area being somewhat against a group of one-story buildings, and a simple calculation showing that the actual cost of the power expended in a single year for lifting the entire product of the works through a distance of 20 feet figured only a little over a dollar, determined the company upon the building of multistoried buildings. The character of the products of this company readily lent itself to such a design, and it was believed that the fixed charges on elevating machinery would be more than offset by a reduction in the horizontal distances necessary to be traversed.

The arrangement of the buildings was determined by



PLAN OF NEW WORKS OF B. F. STURTEVANT COMPANY.

adequate shipping facilities, ample water supply and space for ready disposal of waste material. The advantages of the West as against the East were carefully weighted, but the company readily expressed their abiding faith in the prosperity of New England, in the facilities which it presents for work of the character conducted by this company, and in the quality of its skilled labor as an offset to the present somewhat higher prices for raw material. The best combination of advantages was presented by a lot of nearly 20 acres of land in the town of Hyde Park—already well known as the home of such industries as the Becker-Brainard Milling Machine Company, the American Tool & Machine Company, the new shops of the N. Y., N. H. & H. R. R., &c. Here was presented a population of particularly skilled workmen, which could readily be supplemented by the present employees of the company, the new location being only 6 miles from the old plant. The lot selected has a frontage of about 1300 feet upon the freight yard of the N. Y., N. H. & H. R. R. at Readville station, the distributing point for all freight passing over either the Midland or Providence divisions of that road. One side of the lot is bounded by a plentiful stream known as Mother Brook, and the adjacent shore is at a level of nearly 10 feet below that of the yard and buildings, thus providing sufficient space for dumping waste material for years to come.

The site having been selected, most careful consideration was given to the size and character of the buildings;

the provision to be made for growth. One arrangement of a series of parallel buildings permitted increase only by multiplication of buildings, but provided an excellent opportunity for the carrying of switch tracks across both ends of each building. The other arrangement provided for a group of buildings parallel to the railroad tracks with accommodation for switch tracks between the buildings, and for their entrance at the ends of the buildings, with an opportunity for growth by extension in length. After a careful working out of many schemes and a comparison of the advantages and disadvantages the latter arrangement was adopted.

Material of Buildings.

The construction of the buildings next received consideration. The latest development of all steel and concrete construction with large window areas did not appear to meet the requirements of a group of buildings as permanent and substantial in their character as these. All steel buildings, brick walls and concrete fire proof floors presented disadvantages in the way of discomfort to workmen, inconvenience in attaching machines on hangers and excessive expense which did not appear to be offset by advantages to be secured in the way of absolutely fire proof construction. The type finally selected is composite in its character, consisting of steel interior columns and main steel girders, with heavy brick walls, wood timbered floors and plank roofs. In the case of the

one-story foundry the roof is supported by steel trusses; in the other buildings open timbering with wooden columns in the upper floor is employed. The main floor in the machine shop is of tar concrete, with spruce and maple flooring. The upper floors are carried upon wooden beams spanning the spaces between the steel girders, which follow a unit system of 20 feet on centers through the building. All roofs are of 3-inch plank, with tar and gravel top.

The question of power was early decided to the extent that the entire plant would be electrically driven from a central power house; that the engines would run condensing; that the exhaust steam derived from engines under test, which is considerable, would be utilized for heating, with supplementary amount of live steam admitted at reduced pressure as might be required. The final decision regarding the power house placed it sufficiently far from the ends of the buildings to permit sufficient extension of each and near enough to the water supply to reduce to a minimum the expense of conveying condensing and other water.

Arrangement of Buildings.

In the accompanying illustration is presented a block plan of this plant, showing that in its design the most careful consideration has been given to the transfer of materials through the various buildings to the point of storage or shipment.

The pattern building provides at one end a two-story portion 80 feet square for carpenters and flask makers on the first floor, and for pattern makers upon the second floor. The balance of the building, which is devoted to pattern storage, is provided with intermediate floors, making four in all, separated from the other portion of the building by double fire walls and automatic fire closing doors. The close proximity of this building to the foundry facilitates rapid intercourse.

The foundry, 170 x 350 feet, is designed with the idea of distributing iron upon a track system, and is to be equipped with narrow gauge railways bedded in concrete, making runways between the molding floors. Two craneways run lengthwise of the building through the greater part of its length, and the tracks extend beneath the crosswise traveling cranes in the cleaning room at the end of the building. The brass foundry is located in one corner, a wash room in the adjacent corner, a core room between the two; the latter has ample opportunity for growth toward the center of the foundry, while the foundry itself can be extended to practically double its length. Storage for supplies is provided upon one side adjacent to the railroad switch. From the bins thus provided the iron and fuel charges will be carried directly to the charging floor.

From the foundry the castings will pass to the rear of either the machine shop or the fan shop. The former is of the familiar gallery type, 500 feet long, with wings 40 feet wide, and central runway of the same width for a crane of 20 tons capacity. The lighting will be principally by a series of sawtoothed skylights running crosswise of the roof with glass facing due north. The crane will serve the entire floor and transport heavy castings from the machine tools to the erecting floor, where the completed engine or generator may be lifted upon a transfer car passing through the testing building and there picked up by another 20-ton crane, which will drop it upon the testing plate and subsequently carry it forward to the steam railway track, which passes through the end of the building and provides space for the loading of two cars at a time. The upper floor of this building, together with portions of the adjoining buildings, is devoted to the electrical department and provided with individual small traveling cranes.

The building devoted to the manufacture of fans, heaters, &c., is 80 feet in width, of the same length as the machine shop, is three stories in height, of typical mill construction, provided with all conveniences for handling material and arranged so that shipment can be made from numerous points along one side, while supplies are brought in from the court, between it and the machine shop.

The smith shop, 40 x 80 feet, serves both buildings with equal facility, while the wash house and locker room, measuring 40 x 100 feet and three stories in height,

is so located as to reduce to a minimum the distance to be traversed by the individual workmen. The third floor will be used as a lunch room.

The standard first-floor height in the main buildings is 17 feet, that of the second and third stories is 15 feet. The windows are large and numerous.

The office is to be a model structure of its kind, and is to serve as headquarters for the entire business. It will contain the correspondence, designing and drafting offices, the superintendent's quarters, the cost department, the advertising bureau and a printing office, which will be located in the basement. It will be three stories in height, with a finished attic to provide additional drafting room space.

The equipment of this plant will be largely "Sturtevant" in its character. Beginning with the power plant, the mechanical draft apparatus, the engines and generators and the exhaust head will be of Sturtevant make. The buildings will be heated by the Sturtevant system, the shafting and individual machines driven by motors of the same make, the refuse from the wood working machinery, the dust from the cleaning room of the foundry, the ventilation of the offices, toilet rooms and wash house and the removal of smoke from the smith shop will be accomplished by Sturtevant exhaust fans, while Sturtevant blowers will be used for the brass and iron foundry, forge shop blast and the like, and Sturtevant steam traps will be employed upon the steam driers.

The National Malleable Castings Company Expanding

The National Malleable Castings Company, Chicago, have purchased the plant formerly known as the Grant Locomotive Works. The consideration is reported to be \$150,000. The property consists of 28 acres of land extending from Thirteenth to Sixteenth streets, and lying between West Fifty-second avenue on the east and West Fifty-third avenue on the west. There are on this property ten buildings covering an area of 192,000 square feet. The Malleable Company have also purchased a tract of land containing about nine acres joining the former locomotive works property on the north. This latter purchase was made from E. A. Potter, receiver of the National Bank of Illinois, the purchase price being reported to be \$20,000. Some of the old buildings will be remodeled and additional ones constructed to meet the necessities of the purchasing company.

The Grant Locomotive Works were organized in 1891 with a capital stock of \$1,000,000. After expending \$1,300,000 in construction and equipment, giving employment to 1000 skilled mechanics and turning out 100 locomotives, the plant was closed down in June, 1893. The result was a financial disaster following the panic of that year. The works were subsequently consolidated with the Siemens-Halske Electric Company of America, and were in successful operation until two years ago, when the stock of the company was sold to the General Electric Company, and much of the machinery was removed to other plants.

A New Niagara Power Station.—The Niagara Falls Hydraulic Power & Mfg. Company have commenced the work of excavating on the site of a proposed new power station in the Niagara gorge. This new power house will be located at the water's edge a short distance downstream from the present station. As yet its dimensions have not been announced, but it is known that the current from it will be transmitted to the new industrial center now in progress of development and building at the north end of the city. In order to supply the turbines of the new station with water it will be necessary to extend the hydraulic canal basin some distance north of its present point of ending, but the company own ample land for all their requirements. In addition to this the company some time ago had plans prepared for the construction of a tunnel along the high bank or cliff into which the water now passing through some of the wheels and now being wasted may be discharged into this tunnel and captured and controlled for use the second time. When this is done all the pretty little water falls now to be seen on the face of the

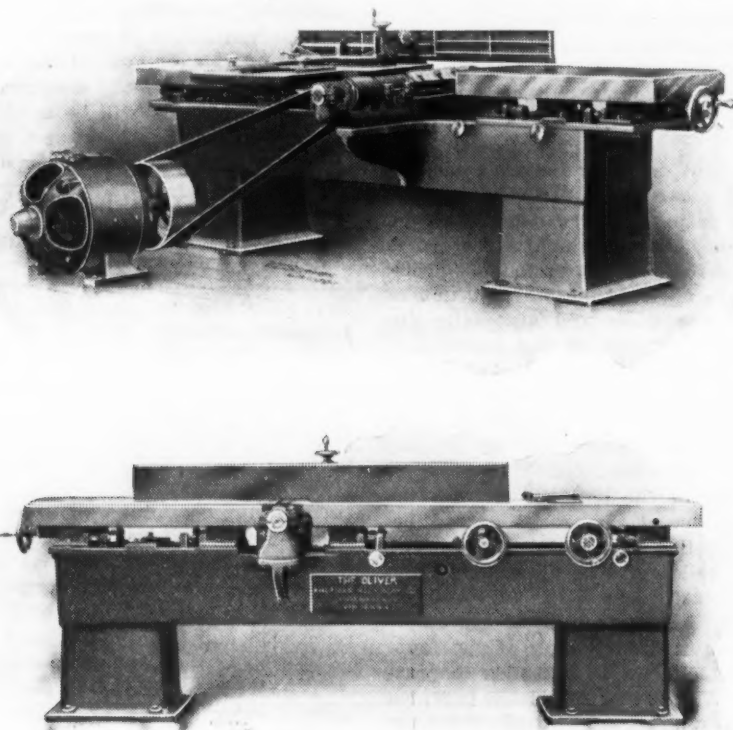
cliff at the site of the company's operations will disappear, and turbines in a new station will be operated by water that has passed wheels of the mills above.

The Oliver Planer and Jointer.

The accompanying illustrations of the Oliver planer and jointer, manufactured by the American Machinery Company of Grand Rapids, Mich., make evident at a glance that some valuable improvements have been made on the machine since it was first placed on the market. One of the most conspicuous advantages which the present type has over the original design is that the machine is mounted upon two columns, one at each end of the bed, thus giving ample foot room, which is of great value to the operator and eliminates the danger of the workman slipping upon the bed of the machine. The great weight of the machine is another feature, contributing to firmness, reducing vibration to the mini-

in dovetailed ways, which are planed in the bed and are so fitted with gib screws that they can be easily withdrawn from the yoke, or cylinder, for convenience in sharpening or removing knives. To these sliding frames are bolted the shoes for the adjustment of the work tables, the rockers upon which the table rests, and also the screws and hand wheels which raise and lower the tables for the depth of the cut. The shoes, or wedges, are tongued and grooved to the sliding frame and securely bolted. They also have large, flat bearing surfaces and are gibbed by separate gibs running in slots, which hold the work table securely to the sliding frame. These surfaces are milled and scraped and are designed to keep the correct plane, or level, of the table at all times. Another desirable feature is that the yoke or frame which carries the cylinder is made in one solid piece, bolted to the bed, with a reservoir for oil under each box.

The cylinder, of forged crucible machinery steel, is



THE OLIVER PLANER AND JOINTER.

imum. One of the most distinctive characteristics is the tilting device. The rear table is hung in rockers and by simply turning one of the hand wheels the bed may be tilted so that any amount of draft may be planed upon pattern lumber; the pattern maker can obtain the draft upon straight pieces of wood. To obtain draft over the full width of the table the rear table is gradually lowered upon the shoes and the material planed until the full length of the knives is brought into action.

The rear table is 5 feet 4 inches long and is moved backward or forward by a cut rack and gear and is very strongly ribbed. The front table is 3 feet 4 inches long and constructed in the same manner, except that it requires no rockers. The sliding frame upon which the front table rests is made in two parts and fitted with an adjusting screw, so that a spring joint, or one that is slightly concave, can be made by allowing the outer end of the table to drop down the desired distance. The table may be quickly brought back to level without disturbing the alignment. The hand wheels for raising, lowering and tilting the rear table are conveniently placed on the operating side of the machine. It is to be noted that the tables on all sizes are 2 inches wider than the knives of the machine and have a groove on the side for use in rabbeting.

The sliding frames which carry the work tables move

3½ inches square, carries two knives and has the other two sides slotted so that molding knives of any desired shape or design may be used. The cylinder should run about 4200 revolutions per minute. The diameter of the cylinder bearing is 1¼ inches, and the two main bearings are 8 inches and the outer bearing 6 inches long. The cylinder has about 3-16 inch of oscillation, or end play, which may be taken out by setting the driving pulley against the end of the bearing. This is necessary when special cutters are to be used.

The adjustable fence shown on top of the table is operated by means of a worm wheel and gear, so that any degree of pitch necessary may be obtained. These machines are also manufactured for electrical drive, and any standard type of motors are available.

The Proposed Jones & Laughlin Ore Road.—There have been no new developments in the past week in regard to the proposed ore road to be built by the Jones & Laughlin Steel Company from the lakes to Pittsburgh. A great deal of sensational matter about this enterprise has been printed in the daily press which is without foundation in fact. The Jones & Laughlin Steel Company have taken out charters in different States through which the proposed new road will pass

and other preliminary work is being done. No official announcement of their plans is likely to be made by the company for some time. The report that the Union Steel Company of Pittsburgh are identified with this new project has been denied on good authority.

Oil Fuel for the Navy.

The Report of the Special Board on Tests of Liquid Fuel for Naval Purposes.

WASHINGTON, D. C., October 28.—The annual report of Admiral George W. Melville, Chief of the Bureau of Steam Engineering, has been transmitted to the Secretary of the Navy. Much interest attaches to this report, owing to the space devoted therein to a discussion of the results of an elaborate and exhaustive series of experiments in progress during the past year under the supervision of the Special Board on Tests of Liquid Fuel for Naval Purposes. The preliminary findings of this board are set forth in detail and the summarized data of the tests made are presented. Admiral Melville also describes at some length the urgent necessity for one or more specially constructed repair shops, embracing foundry, machine, pattern and coppersmith shops, and carrying a large supply of fittings and spare parts. The work of the "Vulcan" during the Spanish war is referred to in this connection, and the value of that vessel's services in the Santiago campaign is said to have been greater than those of any other vessel except the battle ship "Oregon." The results of a series of tests of the Hohenstein type of water tube boiler are set forth, and it is recommended that this boiler be "given a place on the very limited list of straight tube water tube boilers of American design that have been found suitable for naval purposes."

Liquid Fuel.

In summarizing the results of the tests of liquid fuel made by the special board, Admiral Melville expresses the opinion that the engineering and mechanical features involved in the problem are likely to be completely solved in the near future. The commercial feature, relating to cost and supply, may be left to work itself out, but there remains an important question as to whether battle ships can be so constructed as to permit the safe and efficient installation of oil fuel, and this last factor in the problem will, in his opinion, require much experimentation before it can be determined.

It is evident, says the report, that there is a very strong desire and purpose upon the part of many ship owners to substitute oil for coal. The thermal, mechanical and commercial advantages that would result from a change are so well known that it is unnecessary to recount them. Nearly every reason that can be advanced for using oil as a fuel in the mercantile marine is also applicable to the navy. In the case of war ships, however, there are also military benefits to be secured that are as important as the commercial and mechanical advantages. Any fuel installation which will obviate the smoke nuisance, reduce the complement in the fire room, extend the steaming radius of the war vessels, and permit maximum speed to be obtained at shorter notice, increases the efficiency and value of the fighting ship.

The numerous experiments that have been made by naval powers during the past 40 years in the attempt to use oil as a fuel show how important this question is regarded by military experts. It is now plain why success was not attained. There was too much effort exerted to burn oil in the same manner as coal. It is now realized that the oil should be atomized (it is impossible to completely gasify it) before ignition, and that the length of the furnace, the volume of the combustion chamber and the calorimetric area are factors which must be considered. In fact, it is highly probable that it may be found advisable to design a special boiler for burning oil.

In the investigation of the subject of using liquid fuel for naval purposes it will be necessary to give due weight to the various features that will influence, if not determine, the solution of the problem. The question, therefore, comprises the following divisions:

The Engineering or Mechanical Feature.

This relates to the efficient and economical burning of oil and to the possibilities of increasing the consumption at short notice, so that maximum power can be readily and easily obtained. From the time the mechanical experts realized that the efficient, economical and rapid burning of liquid fuel was greatly dependent upon the success secured in atomizing the oil there was rapid development. It was only a few years ago when the oil was simply thrown into the furnace by means of an injector. When that method was used the evaporation was dependent to a great extent upon the amount of incandescent surface that could be secured to ignite the fuel. It has only been within the last three years that the exceeding importance of atomizing the oil has been recognized.

The liquid fuel board has already secured valuable information upon most of these points. A great service will be rendered the engineering interests of the country if further experiments can be conducted under the auspices of disinterested officials of the navy, who, by reason of their training and experience, should be particularly qualified to carry on such tests. The engineering or mechanical features of the problem will undoubtedly be solved in a degree materially satisfactory to maritime and manufacturing interests, if not to naval experts, by further experimental work of the character that has been performed.

The Commercial Feature.

This relates to the question of cost and supply. It may be regarded as a certainty that, except wherein unusual conditions prevail, the cost of oil for marine purposes will generally be greater than that of coal. The cost may be less for vessels departing from the Gulf and California seaports, but the rule will hold elsewhere. While the question of cost should be of secondary importance in military matters, it must be taken into consideration. It is the expense of transportation that will always prevent the oil from being a cheap combustible. While it may be put on the tank steamer very cheaply at ports like Point Sabine, its commercial value will be determined by the cost of delivery at commercial and maritime centers. This feature of the problem is beyond the ability of the navy to control, but it must be regarded as an important phase of the subject. It is undoubtedly a fact that the transportation charges per mile for oil at the present time are excessive compared with the freightage for coal, and this incongruity of expense account against oil cannot continue much longer.

The Installation on Board Ship.

While the engineer may be most interested in the mechanical features and the ship owner in the commercial aspect, the constructor will meet with difficulties in solving the structural problem relating to the installation of oil fuel on board ship. In all probability the great bulk of the oil in the war ship would have to be kept in the double bottoms. As the petroleum vapors are quite heavy, it may be a difficult matter to free these compartments of explosive gases, especially when the compartments are partly empty. By reason of the great number of electrical appliances in use on board the war ship thousands of sparks are likely to be caused, any one of which might cause an explosion and set the oil fuel on fire. Our limited experience with submarine boats may give us an object lesson as to the liability of hydrocarbon gases to explode. In the merchant service the oil is often stored in expansion tanks or trunks which rise to the height of the deck, and on some of the vessels there is a cofferdam around these tanks so that any leakage of oil can be quickly discovered. It is also a comparatively easy matter to free such tanks of any dangerous gases that may accumulate. Inspection of the tanks at all times can also be readily accomplished. In view, therefore, of the more difficult conditions under which the oil will have to be carried in the naval service, the structural features are certain to have an important bearing upon the question as to whether or not an oil installation is possible in large ships of war. The bureau has no hesitation, however, in declaring that in view of the results already secured

by the liquid fuel board an installation should be effected without delay on at least a third of the torpedo boats and destroyers.

The structural disadvantages that may prove so serious in the navy will not be encountered in the installation of liquid fuel appliances in shore establishments. The insuring of a reserve supply of the fuel ought also to be an easy matter for industrial plants. It should therefore be understood that the naval problem is distinct unto itself, and while the experiments so far conducted show that an installation on a battle ship is a serious problem, the tests also prove that for manufacturing purposes crude petroleum is in many respects an incomparable fuel. Probably not over a fraction of 1 per cent. of the oil used as fuel would be consumed by the navy, and, therefore, while further investigations may be necessary to show the adaptability of oil for large war vessels, the tests already conducted will be of great value and afford considerable information to all present consumers of liquid fuel, as well as to those contemplating the installation of oil fuel appliances.

The Report of the Board.

Following is an abstract of the report of the special board, composed of Lieut.-Commanders John R. Edwards, Wythe M. Parks and Frank H. Bailey:

The board has undertaken to solve some of the following problems:

1. The relative advantage of air and steam as an atomizing agent for liquid fuel. The question of supply of fresh water is very important in the navy, and therefore the use of steam should be obviated, if possible. On the other hand, the air compressors are quite heavy and take up considerable room. As air compressors, however, are used for many purposes on board ship, it might be possible to have a central plant for all purposes. It is also important to know to what extent it will be necessary to superheat the steam in case it is used as the atomizing agent.

2. There is a wide divergence of opinion as to the pressures at which oil, steam and air should be delivered to the burners. Progressive tests may afford valuable information upon this point.

3. The design of the steam generator. As the experimental boiler now in use by the liquid fuel board is of the water tube type it will be possible to extend the length of the furnace and make other changes which will give important information as to whether or not it would be advisable to design a special form of marine boiler for oil fuel installation.

4. The simplest and most economical means of heating the air and the oil. In view of the result of the present experiments and of the information obtained from outside sources, there is no doubt but that the air should be heated, and it would seem that, particularly in a water tube boiler, such heating could be effected in a simple and cheap manner by utilizing the heat radiated to the ash pit.

5. The value or necessity of an air receiver when compressed air is used as the atomizing medium. Can the pulsations of the compressor be reduced or minimized by installing such an intermediate receiver between the compressor and the burner?

6. Experiments could be made concerning the baffling of the gases, for the tests already conducted show that the calorimeter arc can be somewhat reduced when using oil.

7. The relative value of leading types of burners. Particularly is it necessary to know whether a simple burner should be installed and provision made for heating the air, or whether an appliance should be installed which partially gasifies the oil before igniting. There are on file in this bureau over 2000 drawings and specifications pertaining to the use of liquid fuel, and it is said that new patterns are being issued at the rate of about 30 a week. In view of such widespread interest in the subject, the board deems it important to test representative types of the various classes of burners.

8. The problem as to whether the oil could be consumed under all conditions without producing smoke. In the naval service this is an important question. As there is also a tendency to compel manufacturers to take

means to prevent smoke issuing from the stacks of their plants, the question also concerns the general public.

The board considers it but just to acknowledge that through the generosity of the Oil City Boiler Works the Bureau of Steam Engineering has had placed at its disposal without cost for rental a thoroughly equipped experimental plant. The experimental boiler is of the Hohenstein design, and it is the same boiler that was used by the Navy Department in conducting the extended series of tests that were made with coal at various rates of combustion. The appropriation of \$20,000 that was made by the Fifty-seventh Congress for determining the value of liquid fuel for naval purposes will therefore be devoted, in great part, to original investigation and research. The board has also had at its disposal an unexpended balance of \$7088.09 from a former appropriation. In view also of the fact that everybody now performing duty in connection with the experiments is in the naval service, the appropriation available represents only a portion of the actual expenses of the experimental work.

The Bureau of Steam Engineering has supplemented the work of the board by calling upon officers in various parts of the world for information upon the subject. The board has visited the steamers "J. M. Guffey," "Paraguay" and "City of Everett," and has carefully observed the particular features of each installation. Some of the experts of the fuel oil department of the Standard Oil Company have visited the experimental plant and given valuable advice along certain lines. The board has also been placed in possession of the extensive correspondence carried on by the Bureau of Steam Engineering during the past year with experts and manufacturers. It can therefore be expected that if the tests can continue, valuable information will not only be secured, but it will be possible for the navy to render a direct service to all who have a professional or financial interest in the general solution of the liquid fuel problem.

Six burners were used in these tests, which were designed to show especially whether or not it would be possible to secure a greater evaporative efficiency from the boiler with oil than was secured with coal. These six burners, placed 18 inches apart, were ranged across the front of the furnace, there being a separate opening in the furnace wall for each burner. Considering the burners as arranged in pairs, those of each pair were inclined toward each other at an angle such that their flame impinged in the transverse center line of the furnace. The arrangement for weighing the feed water and the facilities for securing forced draft were the same as during the coal burning tests.

Uniform Quality of Oil Used During Experiments.

While the bureau received many offers from various sources to furnish oil free of cost at the wells, careful inquiry showed that there was no certainty when this oil could be delivered at the experimental plant. Since time is a great element in the matter, the board deemed it necessary to use means whereby a steady supply of oil would be assured and no delay ensue from a lack of liquid fuel in the storage tank. The oil was therefore secured from the Standard Oil Company. The product of different localities will be tested, for the evaporative efficiencies of each field should be ascertained.

Method of Weighing Oil Used.

From the storage tank the oil was pumped, as desired, into a weighing tank, from which it flowed by gravity into the oil feed tank. From this reservoir the oil was pumped into a pipe leading to the burners, constancy of the pressure being secured by an air chamber and a relief valve. An overflow pipe led from relief valve back to the feed tank. The weighing and feed tanks were fitted with gauge glasses graduated to 5 pounds, by the aid of which the exact weight of oil was secured at the end of each hour, the same as with the feed water.

The air for atomizing the oil is supplied by a Root blower driven by a direct connected engine. This blower delivered 8 cubic feet of free air per revolution, at pressures ranging from 0.78 pound to 4.68 pounds per square inch. The air pressure was measured by a mercury column, the location of which was such that it gave

substantially the same pressure as at the discharge of the blower. The temperature of the compressed air was taken near the same point. A Rand air compressor has been bought and will be installed, enabling higher pressures of air to be used.

The process of getting up steam in the main boiler was somewhat slow, as dependence had to be placed on a small auxiliary boiler for driving the Root blower until sufficient steam pressure could be secured for that purpose from the main boiler. The auxiliary boiler was only equal to the task of supplying the air to two burners.

The oil used was from the Beaumont, Texas, field. It is said to have been subjected to an inexpensive treatment which removed the sulphur and some of the more volatile hydrocarbons. The board believed that it would be best to use an oil that had been thus treated until some positive information could be secured as to whether or not it was advisable to attempt to use crude oil. It should also be stated that delay might have ensued if it had been attempted to depend upon individual shipments. The judgment of the board in this respect has been vindicated, for there have been times since the experiments commenced when other parties in the city have been unable to secure any oil at any price.

Chemical Composition of the Oil Used During Tests.

The character of the oil used during the official tests can be best appreciated by comparing it with the average grade of the crude product. The changes wrought by the refining process can thus be clearly seen by comparing the analyses of the crude Beaumont product and that used in the experiments.

Analysis of Beaumont Crude Oil.

	Per cent.
Carbon (C).....	84.60
Hydrogen (H).....	10.90
Sulphur (S).....	1.63
Oxygen (O).....	2.87

The amount of sulphur in different samples of the crude Beaumont oil varies from 2 to 3 per cent.

Calorific value per pound of combustible, B. T. U.....	19,060
Specific gravity.....	0.924
Flash point, degrees F.....	180
Fire point, degrees F.....	200

On distillation at atmospheric pressure to 524 degrees F. it was found that the

	Degrees F.
First 10 per cent. passed over below.....	428
Second 10 per cent. passed over between.....	428 and 485
Third 10 per cent. passed over between.....	485 and 524
Fourth 10 per cent. passed over between.....	524 and 554

Analysis of Oil Used by Liquid Fuel Board as Determined by the Chemist of the Navy Yard, New York.

On distillation at atmospheric pressure to 680 degrees F. it was found that the

	Degrees F.
First 10 per cent. passed over between.....	216 and 482
Second 10 per cent. passed over between.....	482 and 523
Third 10 per cent. passed over between.....	523 and 552
Fourth 10 per cent. passed over between.....	552 and 680

This oil showed on analysis to be composed of the following constituents:

	Per cent.
Carbon (C).....	83.26
Hydrogen (H).....	12.41
Sulphur (S).....	0.50
Oxygen (O).....	3.83

The sulphur was determined by oxidation with fuming nitric acid in an open capsule.

Specific gravity at 60° F.....	0.926
Flash point, degrees F.....	216
Fire point, degrees F.....	240
Vaporization point, degrees F.....	142
Loss for six hours at 212° F., per cent.....	21.65

The calorific value of the combustible, calculated on the analysis of the United States chemist by Dulong's formula—viz.:

British thermal units = $14,500 C + 62,100 (H_2) = 19,481$.

These analyses show that nearly all the sulphur was removed from the crude petroleum.

It will probably be best to continue using a uniform grade of oil for some time, so that comparisons can be made of the burners as well as the efficiency and advantages of the various methods of atomizing the combustible.

Conditions Between the Combustion Chamber and Smokestack.

The temperatures in the base of the stack were remarkably free from the rapid fluctuations that characterized the coal burning trials. There was no flaming in the stack except during the last two hours of the eighth test, and even then the fluctuations of temperature were absent. This was a test where everything was forced to the utmost, and therefore unusual conditions prevailed. The stack temperatures were noted by a Tagliabue mercury nitrogen thermometer. It was used without mishap throughout the series of trials. Advantage was taken of the constancy of the stack temperature to check the readings of a Brown quick reading pyrometer. The pyrometer was afterward used in the furnace and elsewhere to record temperatures that were not excessive. For temperatures higher than 1600 degrees F. a platinum rhodium electric pyrometer was used. The measurements secured with this instrument show a maximum temperature of 2200 degrees F. for both natural and forced draft conditions.

Provision was made for introducing extra air at the sides of the furnaces. Holes were cut 8 x 1½ inches through the side walls, on a level with the furnace floor and close to its back wall. A flue was built of loose fire brick across the furnace floor, thus connecting the two openings. The roof of the flue had openings between the bricks, thus permitting extra air to be introduced where the combustion was most intense. This extra air supply was cut off during the natural draft and maximum forced draft trials. The aggregate area of all openings for the admission of atmospheric air into the furnace is given in the detailed report of each trial.

Character of the Information Desired.

Before attempting to test the relative merits of individual burners the board sought general information along the following lines:

The evaporative efficiency of oil as compared with coal under like conditions.

The degree to which the combustion of oil could be forced with both steam and air as atomizers when using both natural and forced draft.

The ability of a hydrocarbon burner to work under forced draft conditions.

The liability of the boiler to injury when using oil under forced draft conditions.

The amount of steam or air requisite for atomizing purposes.

The degree of pressure which should be applied when steam or air was used as the atomizing medium.

The effect of preheating the air necessary for combustion.

The time required to train men to operate the burners.

The best means of reducing the noise caused by the numerous but minute explosions within the furnace.

The attitude of the firemen as regards operating an oil installation.

Endurance Test of 116 Hours.

The board particularly deemed it expedient to make an endurance test of the plant. A test of this nature was therefore conducted for a continuous period of 116 hours. The torpedo boat "Gwin" was ordered from the Naval Academy, and the torpedo boat "Rodgers" from Norfolk, to assist in the experiments. The day watch of eight hours was conducted by a regular crew of employees of the Oil City Boiler Works, although all the data during this period were taken by observers from the drafting room staff of the Bureau of Steam Engineering. The crew of the "Gwin" operated the boiler and auxiliaries during half the night, the crew of the "Rodgers" taking the other night watch during the entire test. The data during the night were taken by the leading petty officers of the two torpedo boats, the commissioned and warrant officers in charge of the respective watches checking and verifying the data. The character of the data collected during the night, compared with that secured during the day, shows the efficiency of the crews of the torpedo boats even as compared with the highly trained force of draftsmen in the Bureau of Steam Engineering.

After a preliminary run for the purpose of training officers and crews in taking data and operating the plant, the test was commenced at noon on August 4. Experts from the Oil City Boiler Works and from the fuel oil department of the Standard Oil Company were present during each day, and at times visited the plant at night. The members of the board, the commissioned officers in charge of the watches, the warrant machinists in the fire rooms, as well as the enlisted force of the torpedo boats, availed themselves of the opportunity to secure advice and assistance from these experts, who, by reason of their training, experience and opportunity, are and ought to be particularly well posted upon the subject. After the first day it was seldom that these experts even offered a suggestion as to operating the burners. They declared that the commissioned officers in charge of the watch and the warrant machinists took such interest in the work and had so quickly grasped the salient points of securing complete combustion that it was best to turn the plant completely over to the direction of such interested parties.

The oil burners during the endurance test were so regulated that they consumed about 830 pounds of oil per hour. Although the data were only recorded at hourly intervals throughout the test, there were unofficial readings and checks made between the hours, thus insuring uniformity in the performance of the boiler.

The Hayes Hydrocarbon Burners.

During the course of the experiments the so-called Hayes hydrocarbon burner was tested, two preliminary trials being made. Some representatives of the company owning the burner were present during these trials, and suggestions were sought of these men, who were supposed to have expert knowledge of that particular appliance. At no time were they able to secure from the boiler an actual evaporation of 11 pounds of water. During the first experimental trial, on September 10, it was manifest that the bulk of the combustion was above the tubes and in the uptake and stack. In consequence of this loss of heat, and before the second unofficial trial was attempted, the draft opening above the tubes was reduced in the proportion of 16 to 10 $\frac{1}{4}$. This caused a noticeable improvement. It should be stated that it required ten days for the company to prepare for the first preliminary trial. Their experts had been furnished blue prints, showing in detail the character of the experimental plant, also the position and arrangement of the baffle plates in the experimental boiler. Representatives of the company had also been permitted to witness some of the previous tests. The experience with this company has now caused the Liquid Fuel Board to compel every inventor to make arrangements whereby he can install his appliance within three days.

Steam for the burners was supplied from an independent boiler at a uniform pressure of 90 pounds. During the unofficial trials the steam was not superheated, the inventor having previously maintained that he could use exhaust steam and attain the object desired. It might also be incidentally stated that the claim was made that one single burner would consume all the oil that would be required for even forced draft purposes.

Oil was supplied to the six burners during the unofficial tests at a uniform pressure of 80 pounds. Besides the air introduced through the heating tubes, some additional air was admitted through what were formerly the ash pit openings. The aggregate area of these ash pit openings was about 60 square inches.

During the official trial (test No. 9), which continued for six hours, the steam for the burners was superheated. There was fitted in the opening above the tubes and below the steam drum of the main boiler 44 feet of 1 $\frac{1}{2}$ -inch pipe. This pipe was in the form of three return bends. Steam from the cylindrical tank boilers was led through this pipe and thence to the burners.

The leading experts of the company did not attend this official trial. The mechanics who installed the burners, however, operated these appliances under the direction of the warrant machinists. The board was informed that it was these mechanics who operated the burners during an official test that had been made at an electric light station in the city, where the inventor claimed that he had evaporated 18 pounds of water per pound of com-

bustible. It is needless to say that no such results were secured under the experimental boiler.

Tests With Burners Using Steam for Atomizing.

Progressive tests with burners using steam for atomizing were then made. One of the special purposes of conducting these trials was to ascertain the exact amount of steam that would be required for atomizing the oil. Every possible check was used to secure trustworthy data. All during the trials there were searches for leaks, but none were discovered.

The board was desirous of ascertaining just how much steam was required for atomizing, and therefore a separate boiler was installed for generating steam for this purpose. It is a cylindrical return tube boiler with two plain cylindrical furnaces. This boiler is piped to furnish steam for the oil burners, and has no other steam pipe leading from it. The opening from the safety valve was blanked. This boiler is fitted with two oil burners of Oil City Boiler Works design in each furnace, these burners using air for atomizing purposes. After steam was raised one burner in one furnace was found sufficient to keep the steam pressure uniform.

This boiler was put in thorough order at the Navy Yard, New York, and carefully made tight at 100 pounds pressure. During the oil burning test great care was taken to keep both the water level and the steam pressure in this boiler uniform. The water used was carefully weighed in a separate weighing apparatus, in exactly the same manner as the water supplied to the experimental boiler.

The pressure for atomizing purposes, as well as the pressure at which the oil was forced to the burner, was increased each day. It was found that the higher the pressure the greater the amount of water that was evaporated. The efficiency was also slightly greater as higher pressures were used. The percentage of steam required for atomizing the oil, however, also slightly increased as higher pressures were used.

During these tests deflectors were placed in the ash pan openings, so as to cause the air to be drawn up near the burners, thus effecting combustion nearer the front of the furnace. The average percentage required for atomizing purposes was about 4 $\frac{1}{2}$ per cent. of the entire evaporation.

In these three tests the side burners were directed toward the center of the furnace more than heretofore in order to reduce the amount of heat absorbed by the side walls. The amount so absorbed was judged of by the condition of glow immediately after extinguishing the burners. This glow of the side walls, and also of the back and bridge walls, generally showed a more intense combustion on the right side of the furnace than on the left. The fact that the steam and oil connections to the burners were also at the right side of the furnace front suggests the desirability of proportioning the piping, both as to size and location, so as to get substantially equal pressure at all burners.

Before making further tests the front wall of the furnace was rebuilt with ferruled opening 8 inches in diameter for the burners. Ample latitude was thus allowed for the angular setting of the burners, and there was also opportunity for trying the effect of admitting air around the burners. An accident to the engine of the fan blower prevented the continuance of these trials with different pressures of forced draft. It should be ascertained just how much steam is required for atomizing purposes when the boiler is forced to its utmost. The board deems it important, when opportunity will permit, to make an extended series of tests with steam as the atomizing agent. Fresh water can be secured in unlimited quantities at nearly all naval stations, and it might not be a difficult matter to make arrangements whereby the torpedo boats and destroyers could be furnished with an ample supply in specially constructed tanks, thus obviating the risk of being compelled to feed salt water into the boilers.

Even if compressed air should be used on the torpedo boats as the atomizing agent, an accident might happen to the compressor plant which would compel the temporary use of steam. There is therefore an urgent necessity to secure reliable data upon the subject of how

much steam is required for spraying purposes under various conditions of natural and forced draft.

The F. M. Reed Combined Air and Steam Burner.

The board gave particular attention to a series of tests of the F. M. Reed combined air and steam burner, since it is desirous of securing definite information upon the subject as to whether or not it was advantageous to use a combination of both air and steam as the atomizing agent. The inventor personally operated the burner and every effort was made to reduce the amount of air and steam used for spraying purposes.

It is by a process of eliminating undesirable classes of burners that the best form can be secured, and therefore the board has no hesitation in stating that further experimentation with the combined air and steam burner should not be made.

Thermal Efficiency Not Increased by the Use of Steam.

There is quite a widespread misconception regarding the part that the steam which is used for atomizing purposes plays in effecting combustion. It is supposed by many that after atomizing the oil the steam is decomposed and that the hydrogen and carbon are again united, thus producing heat and adding to the heat value of the fuel. While it may be true that the presence of steam may change the character and sequence of the chemical reaction and result in the production of a higher temperature at some part of the flame, such an advantage will be offset by lower temperatures elsewhere between the grate and the base of the stack. All steam that enters the furnace will, if combustion is complete, pass up the stack as steam, also carrying with it a certain quantity of waste heat. The amount of this waste heat will depend upon the amount of steam and its temperature at entrance of the furnace. The quantity of available heat, measured in thermal units, is undoubtedly diminished by the introduction of steam. In an efficient boiler it is quantity of heat rather than intensity that is wanted. For many manufacturing purposes intensity of heat may be of primary importance, but in a marine steam generator a local intense heat is objectionable on other grounds than those of economy—viz., its liability to cause leaky tubes and seams from the unequal expansion of heating surfaces.

Information Already Obtained.

It is believed that expert engineers will be able to make important deductions from the trustworthy data that have been so carefully collected.

The following information has undoubtedly been secured:

- a. That oil can be burned in a very uniform manner.
- b. That the evaporative efficiency of nearly every kind of oil per pound of combustible is probably the same. While the crude oil may be rich in hydrocarbons, it also contains sulphur, so that, after refining, the distilled oil has probably the same calorific value as the crude product.
- c. That a marine steam generator can be forced to even as high a degree with oil as with coal.
- d. That up to the present time no ill effects have been shown upon the boiler.
- e. That the firemen are disposed to favor oil, and therefore no impediment will be met in this respect.
- f. That the air requisite for combustion should be heated if possible before entering the furnace. Such action undoubtedly assists the gasification of the oil product.
- g. That the oil should be heated so that it could be atomized more readily.
- h. That when using steam higher pressures are undoubtedly more advantageous than lower pressures for atomizing the oil.
- i. That under heavy forced draft conditions, and particularly when steam is used, the board has not yet found it possible to prevent smoke from issuing from the stack, although all connected with the tests made special efforts to secure complete combustion. Particularly for naval purposes is it desirable that the smoke nuisance be eradicated, in order that the presence of a war ship might not be detected from this cause. As there has been a tendency of late years to force the boilers of in-

dustrial plants, the inability to prevent the smoke nuisance under forced draft conditions may have an important influence upon the increased use of liquid fuel.

j. That the consumption of liquid fuel cannot probably be forced to as great an extent with steam as the atomizing agent as when compressed air is used for this purpose. This is probably due to the fact that the compressed air used, after entering the furnace, supplies oxygen for the combustible, while in the case of steam the rarefied vapor simply displaces air that is needed to complete combustion.

Necessity of Permitting Unofficial or Preliminary Trials.

Between the several official tests there are invariably conducted a number of unofficial trials, and by reason of this experimentation valuable suggestions are received. Those who have received permission to install their appliance find that it is quite a different matter to apply it to a boiler that is capable of developing 2000 horsepower from what it was to install it on some boiler that supplied steam to a small vessel or medium sized manufacturing plant.

Up to the present time no firm have been able to tell the board the best manner in which their device should be operated. In fact, the details of installation of every burner yet tested are quite different when completed from that projected at the beginning of the test. The two or three days that are given to experimental trials invariably furnish surprises to the inventor. Probably no better illustration could be given of the lack of definite knowledge in regard to the correct way of operating burners than has been shown during these experiments. The experience of the board in this particular respect shows the necessity of having some disinterested experts conduct an extended series of tests to determine the guiding principles which should be followed in the burning of liquid fuel. There has been sufficient evidence already produced to prove that in all probability special forms of burners will be required for different types of boilers. It can hardly be expected that a burner which could do efficient and economical work in some small steam generator would be equally applicable to the largest steam generators of the marine type.

In noting the evaporative efficiency secured, it should be remembered that the experimental boiler was designed for actual navy conditions, and that the limitations prescribed by the Department as to height, weight and floor space were of a severe nature. There is not only considerable radiation from the boiler, but the proportion of heating to grate surface is not as large as in land boilers. Taking these facts into consideration, the results are exceedingly satisfactory. The engineering world is looking for comparative results from the series of tests that are now conducted, and trustworthy information in this respect will be furnished.

Oil Installation on Torpedo Boats.

The information and data already secured warrant the immediate installation of oil fuel appliances on two torpedo boats and two torpedo boat destroyers, to test the adaptability for use with water tube boilers of bent tube types. The installation could be effected on boats of similar character, so that an earnest but friendly rivalry would be created between the crews of the several vessels. There will come development and success by boldly equipping several boats with different types of installation. The morale of the torpedo boat flotilla can be strengthened in no better way than by experimenting along this line. In all probability but one or two of the bent tube types of boilers fitted in our torpedo boats or destroyers will burn oil efficiently unless extensive baffling is resorted to in the furnaces so as to direct the products of combustion among the tubes. Extended tests should be made with torpedo boats, to find out the best means of securing effective baffling.

The board has been greatly impressed with the necessity of keeping in close touch with experts throughout the country who are making a particular study of this subject. The information secured by making careful inspection of efficient installations and by personal interviews with recognized authorities upon the subject can hardly be overestimated. It is hoped that it

will be compatible with the interests of the Department to permit some junior officers of the line to accompany the board on every such inspection, for the resulting benefits to the naval service would be very great.

An Efficient Experimental Crew Secured.

The experience of the past two months has undoubtedly caused the crew of the torpedo boat "Rodgers" to be well trained in the handling and operating of oil fuel devices. This crew has been so well drilled and has been so receptive for information that they can now quickly tell whether the burners are efficiently or properly regulated. By noting the character and length of the flame, the color of the escaping gases from the chimney, the condition of affairs in the furnace and combustion chamber as observed through the sight holes, the roar of the air as combustion takes place, and the appearance of the bridge wall they can quickly adjust the several valves and secure the best possible results. The efficiency of the crew in this respect has been due in great part to the zeal, intelligence and ability of the commanding officer of the boat, Ensign John Halligan, Jr.

Test of Hohenstein Straight Tube Water Tube Boiler.

Admiral Melville makes a strong argument for greater attention to the construction and installation of boilers on war ships and describes in detail a series of tests made with the Hohenstein straight tube water tube boiler by the same board which conducted the liquid fuel tests. He quotes approvingly the conclusions of the board after a long series of tests of this boiler. Careful examination of the boiler after the tests showed no distortion of the tubes nor any damage to the boiler, although the records show the severe work to which it was exposed. The board reported that under these severe trials the boiler shows no indication of injury whatever. Not a leak has developed and not a tube has been bent. The tubes have frequently been examined, and they are clear of mud, showing that a good circulation has been maintained. The casing of the boiler has not proved satisfactory, the lining not being able to stand the effect of strong forced draft. This has been probably due to the use of improper nonconducting material. This defect is one which can be easily remedied by a more liberal use of fire tile or fire brick. The front drum is only 24 inches in diameter. Although this boiler is so baffled that it has given reasonably dry steam, and the design of the boiler is such that there is a much greater water surface in the drums, and at least an equal weight of water to that used in other water tube boilers, yet the board considers that for marine work, where the ship will roll and pitch, and thus cause water level to vary, the front drum should be increased to about 42 inches in diameter. With an improved casing and a larger front drum for the boiler, the series of experiments conducted indicate that this boiler is a satisfactory steam generator for the naval service. The board therefore recommends that the Hohenstein boiler be given a place on the very limited list of straight tube water tube boilers of American design that have been found suitable for naval purposes. The board believes that the important question of selecting an approved water tube boiler for naval purposes will be finally settled by a process of selection from types installed on board ship and subjected for several years to the stress of service conditions. In order, therefore, to assist in discovering an approved type that will meet the requirements of the navy, the board recommends the use of the Hohenstein boiler on an American war ship, preferably one requiring a large installation.

W. L. C.

The Minnequa Works.

Camp and Plant, published at Denver, publishes a series of fine recent photographs of the different departments of the new Minnequa Works of the Colorado Fuel & Iron Company, at Pueblo, Col. The present status of the various parts of the works is given as follows:

Three blast furnaces are in operation—A, which has just been blown in after relining, and the old furnaces,

B and C. Furnace D will probably be blown in within six weeks. Work is being pushed on Furnace E, and plans are being drawn for F. Each of the new furnaces will produce from 300 to 325 tons of pig iron each day. The ore, coke and limestone bins are completed for the first four furnaces, and those for F are being put up now.

The new Bessemer steel mill, comprising two 15-ton vessels, three 10-foot iron cupolas and two 7-foot spiegel cupolas, will be started some time in November of this year.

The new rail mill, comprising the old mill and the so-called rail mill extension, will be running soon after January 1, 1903.

The open hearth plant will be in operation some time in March, 1903.

The new merchant mill will commence operations some time within a year.

The 40-inch blooming mill, for rolling blooms and billets for the merchant mills and rod mills, and slabs for the plate mill, will begin running in January or February, 1903. As soon as the 40-inch blooming mill starts the rod mill will be ready to begin operations. The wire mill is even now almost ready to begin turning out all sorts of wire, but cannot, of course, be opened until the rod mill, which furnishes the material for making wire, begins work.

It will be almost a year before the plate mill and the sheet mill will be ready to start.

The new electric plant is furnishing all the power required at present, and new generators will be installed as soon as they are needed.

The shops, the completion of which has given the plant one of the most extensive shop systems of any steel works in the country, consisting of machine shop, boiler shop, smith shop, roll shop, pattern and carpenter shops, have been completed for over a year. Most of the cars for mines of the company are built here, and a great part of the repair work for the entire Colorado Fuel & Iron Company system is done here. The large new foundry will be ready for work within a few weeks.

The new pumping plant is now all installed and has sufficient capacity to supply all the needs of the plant with all the enlargements projected.

For the present, at least, there will be no enlargement of the pipe foundry, which has been in operation for some years.

Work on the new yard and track system is progressing, but will not be completed for some time.

Combination Die for Sheet Metal Flanges.

BY M. H. CILLEY, MARE ISLAND, CAL.

The accompanying drawings give a plan of a die that I have recently designed for making sheet iron flanges. It might be well to state that we do a great deal of ventilating work and use large quantities of 3 and 4 inch sheet iron pipe, which is made up in convenient lengths to handle. These are secured to each other by flanges, so that it becomes a simple matter to remove a section of the pipe for cleaning, &c., by simply removing a few bolts. It has been our custom in the past to make these flanges by hand from No. 16 and No. 14 sheets. The stock was so heavy that it became necessary to cut the center bolt out with a round nose cold chisel, then turn the flange with a hammer and trim the outer edge with the stock shears and lastly punch the holes for the bolts. But we found this method was too expensive, a pair of flanges costing about 75 cents. Since we have made the die we are able to make the flanges for less than 5 cents a pair, and we also get a better flange, each one being an exact duplicate of the others. Thus a fit between any two flanges is guaranteed, which was not the case when made by hand and by different men.

The drawings, Figs. 1 to 5, give full details of the die. Fig. 6 represents a plan and Fig. 7 a profile view

of one of the flanges, which is made complete in this die by one blow of a single acting press.

The first operation, as the die descends, is to cut the

operation, which is the drawing of the cup. Then, as the die descends further, it punches the bottom out of the cup and also punches the bolt holes, thus making

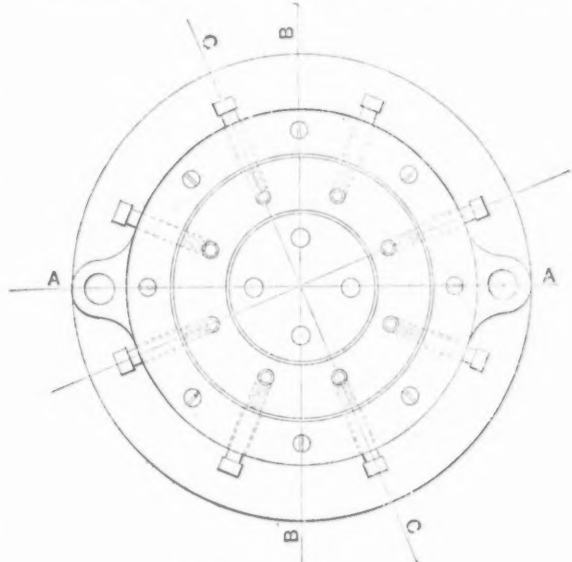


Fig. 1.—Plan of Top Die.

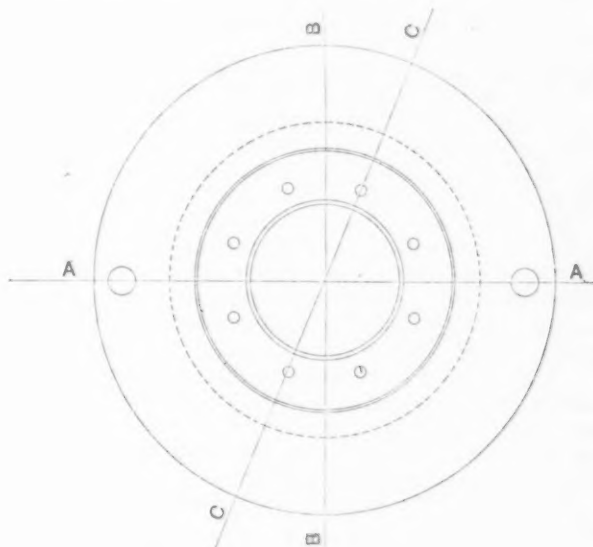


Fig. 2.—Plan of Bottom Die.

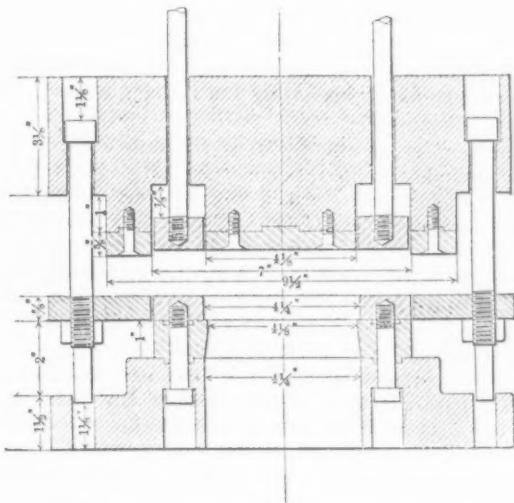


Fig. 3.—Section of Both Top and Bottom Dies at A A.

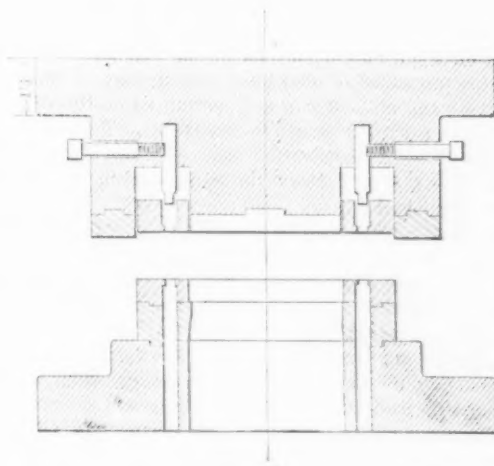


Fig. 4.—Section of Both Top and Bottom Dies at C C.

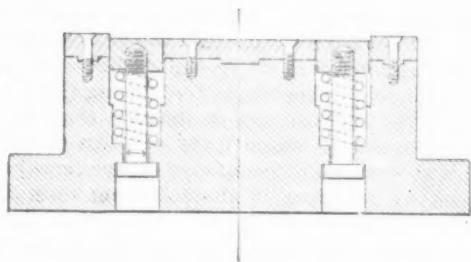


Fig. 5.—Section of Top Die at B B.

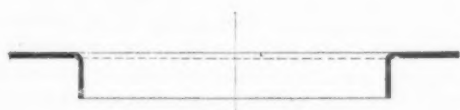


Fig. 7.—Section of Flange.

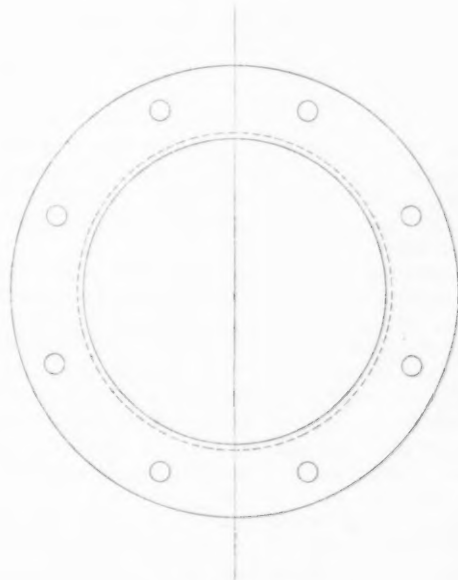


Fig. 6.—Plan of Flange.

COMBINATION DIE FOR SHEET METAL FLANGES.

outside circumference. The blank is then held by a portion of the upper die operated by four strong springs, which keep the blank from wrinkling during the next

the flange complete. As the die ascends the scrap is pulled off and the complete flange is also pushed out of the die.

The Suppression of Smoke in Steam Plants Using Bituminous Coal.*—V.

BY ALBERT A. CARY, NEW YORK.

Arrangements for Heating and Distributing Air Above or Beyond the Fire Bed.

In a paper read before the Franklin Institute during the latter part of 1897 C. H. Bierbaum offered the following simile, which will serve well as an introduction to this subject:

"Smoke proper is always the result of the incomplete combustion of hydrocarbons, whatever the fuel may be from which they have been distilled. Coke and charcoal burn without smoke, since in the process of manufacture they have already been deprived of their respective gaseous constituents.

"The common kerosene lamp may be taken as the simplest smokeless furnace, designed especially for the burning of hydrocarbons, a furnace in which complete combustion occurs. The lamp, under proper conditions, burns with a bright, clear flame, free from smoke, with a large excess of the theoretical amount of air necessary for complete combustion.

"Now remove the chimney and you have a smoky flame, notwithstanding the still freer supply of air. In fact the smoke is due to an excessive admixture of cold air, operating to cool the body of the flame below the temperature necessary for the ignition of carbon. Now take a broken chimney with a small hole in the side at a point of its greatest diameter. If the hole be small enough no appreciable effect may be apparent, but let a draft strike the chimney in a direction so as to enter the opening and a smoky flame is the result. This is due to two conditions: A too limited supply of air from below and the influx of air from the side, acting to cool the combustion chamber.

"The two requisites for preventing the formation of smoke are these:

"To supply an adequate amount of free oxygen, and, secondly, to have the gases subjected to a temperature at which carbon ignites."

By the latter statement Mr. Bierbaum doubtless means carbon mixtures in gaseous states, such as carbon monoxide and the hydrocarbon gases.

In the above illustration we see that when air is introduced in any appreciable amount in the upper part of the furnace or combustion chamber the amount of air supply from below is diminished (owing to the partial destruction of the chimney draft), and when this secondary air is of sufficiently low temperature it will chill the combustible gases (distilled from the fuel bed) to a point below their ignition temperature, and smoke results.

We have already seen that for the best results all, or nearly all, of the air supply should flow through the grates and fuel bed, but in cases where a sufficient supply of air cannot be obtained in this way we are obliged to resort to its introduction over the fuel bed, and sometimes beyond it.

In such cases it is desirable to limit this supply of secondary air to the smallest possible amount, and in nearly all cases with a properly designed furnace and draft pressure secondary air is only needed for a very few minutes immediately following a fresh charge of coal, which when thrown on a hot fire bed will distill off its volatile gases very rapidly and therefore this excessive liberation of combustible gases will need a much greater supply of air while it lasts (to burn them) than can possibly flow through the fuel bed.

When air is being introduced above or beyond the fuel bed the draft pressure in the fire box is considerably diminished, thereby decreasing the amount of air flowing through the fuel bed; therefore the desirability of having the fire bed burned down to practically a bed of incandescent coke before a new charge of green coal is introduced can be understood (the fire bed in this condition requiring the least amount of air supply through the grates), and further, the advantage of charging small quantities of coal at a time (with spread or alternate

methods of firing) is apparent (thereby requiring the shortest possible admission of secondary air).

The smoky results following the admission of a large amount of secondary cold air have been well illustrated in Mr. Bierbaum's experiment by removing the lamp chimney. There is, by far, greater danger of admitting a harmful excess of air through openings over the fire bed than there is through the fuel bed, so a furnace equipped with arrangements for a secondary air supply should be carefully watched and skillfully manipulated. To obtain desirable results an intelligent and experienced fireman can use such an equipped furnace to excellent advantage, but a low grade fireman is pretty sure to obtain from it unsatisfactory results.

Considering this matter of excess of air from a position of fuel economy it is easy to understand the waste resulting from its use. This excess adds nothing to the combustion of the fuel, but carries off through the chimney as many units of heat as are required to raise its temperature from that of the outside air to that of the escaping gases into the chimney.

Whereas it takes one heat unit to raise the temperature of 1 pound of water 1 degree (from 39 to 40 degrees F.), it has been found that 0.2375 heat unit will raise the temperature of 1 pound of air 1 degree F. We have already seen that, theoretically, 11,594 pounds of air are necessary for the perfect combustion of 1 pound of carbon, but on account of our furnace being such an imperfect mixing chamber (for the combustible elements to be brought into intimate contact) double this amount (i. e., 23,188 pounds) of air may be needed to secure complete combustion, which air enters the furnace at, say, 60 degrees F.

Further, let us suppose that the temperature of the gases escaping from the boiler is 600 degrees F. The number of heat units which will be wasted, due to this excess of air, will be $11,594 \times .2375 \times (600 - 60 \text{ degrees}) = 1487$ heat units, or about 10 per cent. of the total heat generated by the complete combustion of the carbon.

(The table previously given shows that the heat of combustion developed by burning 1 pound of carbon to carbon dioxide is 14,600 heat units.)

From the above calculation we can see that the higher the temperature of the air entering the furnace the less our loss will be, and should air be introduced at the same temperature as the escaping gases (in this case 600 degrees F.) no direct fuel loss would result (providing the air was dry). If, however, the air is introduced at 600 degrees F. in any great excess as secondary air (over the fire bed) it will tend to chill the furnace temperature, which (with bituminous coal) should be maintained at about 1400 degrees F. (the ignition temperature of marsh gas), and such chilling is followed by imperfect combustion, which means a loss from another source than that just considered.

In order to reduce these losses it has been the practice of many manufacturers of special furnaces supplying secondary air to provide means for heating the air thus supplied to the furnace and combustion chamber, and the limited extent to which many of them accomplish this end with certain devices offered can perhaps be best understood by referring to the following tests of air heaters used with boilers.

All preheating air devices should utilize the waste gases after they have left the boilers, unless they form a part of the masonry setting, when it is sometimes good practice to "borrow from Peter to pay Paul."

Let us now refer to a very interesting series of boiler tests made by a board of United States naval engineers about two years ago, in some of which tests preheated air was used. A partial table of results is given here:

Tests of Babcock & Wilcox marine boiler for United States steamship "Cincinnati," June 15 to 25, 1900.

Effective heating surface, 2640 square feet.

Air heater placed in path of escaping gases between boiler and chimney. Air heater composed of 3-inch tubes with 495 square feet of surface, and arranged for two passes of gases over the tubes.

Forced draft furnished by a 60-inch Sturtevant pressure blower, with inlet 9.62 square feet and outlet 6.89 square feet.

* Copyright, 1902, by Albert A. Cary.

Ratio of heating surface of boiler to heating surface of air heater 5.33:

Designation of test.	Temperature of air in boiler room.		Temperature gases escaping from boiler.		Temperature air entering heater.		Temperature air leaving heater.		Difference.	Increased temperature of air after passing through heater per square foot of heating surface.	Water evaporated per pound of coal.	Water evaporated per hour from and at 212°.	Coal burned per square foot of grate.	Percentage of efficiency.
	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Lbs.	Lbs.	Lbs.	P. c.
1	101.5	466	(Air heater not used.)		9.47	13,686	19.61	73.1						
10 H	546	143	237	94	0.2300	9.00	14,311	20.18	73.1					
2 H	99.5	458	93.4	206.2	112.8	0.2279	9.88	14,698	20.19	74.3				
9	94	569	(Air heater not used.)		9.61	16,013	22.55	73.2						
3 H	98.2	608.6	94.1	235.9	141.8	0.2865	8.96	22,228	33.51	70.6				
4	101.8	570.6	(Air heater not used.)		8.88	23,098	35.08	70.1						
8	114	661	(Air heater not used.)		9.01	24,900	37.54	69.4						
6 H	115.4	674	106.1	259.5	153.4	0.3099	8.68	25,290	47.81	69				
5	109.3	640	(Air heater not used.)		8.67	26,579	50.38	67.5						
7	117.0	900	(Air heater not used.)		8.21	36,086	59.23	63.4						

It will be noted that in these tests, using preheated air, the entire air supply for the boiler was heated and delivered under the grates. For each 5.33 square feet of boiler heating surface there was provided 1 square foot of air heating surface, and the average amount of heating per each square foot of air heating surface was but a little over a quarter of a degree (0.2636 degree).

In tests numbered 1, 10 H and 2 H, burning practically the same number of pounds of coal per square foot of grate, we find very little improvement in the efficiency of the boiler by using preheated air.

By comparing tests numbered 3 H and 4, burning 33.51 and 35.08 pounds of coal per square foot of grate, we find only one-half of 1 per cent. difference in efficiency due to use of preheated air, which means a total gain of 0.7 per cent.

By comparing tests numbered 6 H and 5, burning 47.81 and 50.38 pounds of coal per square foot of grate surface, we find the efficiency of the preheated air test 1.5 per cent. better than the normal air test, which means an absolute gain of only about 2¼ per cent., and the increased forcing in the No. 5 test would doubtless account for some of this loss in efficiency.

Such results are rather discouraging from a point of fuel economy.

Let us now turn to another series of boiler tests using preheated air, in which a more extended air heater was used, containing about 1.6 square feet of air heating surface per each square foot of boiler heating surface.

In these tests, which were run by J. C. Hoadley in 1881 and 1882, two horizontal tubular boilers were used, each 60 inches in diameter and 20 feet long, containing 65 3½-inch tubes and having 1421 effective square feet of heating surface.

Two different forms of air heaters were experimented with, both being placed in the path of the hot gases escaping from the boiler. The first, which was found somewhat undesirable, consisted of two units, each containing 120 ordinary lap welded tubes 2 inches in diameter and 20 feet long. Outside of these 2-inch tubes and placed concentrically to them was a casing of 3-inch thin iron pipe, which left an annular space between the inner tube and outer casing ½ inch in width, through which the air to be heated was passed. The heated products of combustion were made to pass through the inner 2-inch tube and all were incased in practically air tight chambers (resembling a long horizontal flue).

Experiments with this heater showed that the quantity of heat transferred from the escaping gases to the air was not as much as expected, due partially to the fouling of the inner tubes and an accumulation of dust in the concentric openings.

A second heater was then constructed, which gave better results. This new heater was also horizontal, divided into two units, and was similarly placed over the top of the two side boiler walls.

It consisted of thin (26 gauge) spiral, lock jointed,

tubes, which were tested and found air tight. These were 240 in number (120 in each heater), 2 inches in diameter and 18 feet long. They were carefully secured at both ends into tube plates and the air to be heated was passed internally through their length.

The hot gases delivered from the boiler were made to take a circuitous path, by means of ten baffle plates, plunging downward over the exterior of the 2-inch tubes between one pair of baffles and flowing upward between the next adjoining baffles, the same as the gases travel in most forms of horizontal water tube boilers.

This last air heater was thus similar to the one previously described used with the water tube boiler, only this heater had about nine times more of air heating surface per square foot of effective water heating surface in the boiler, and it made the hot gases from the boiler take 11 passes over the air tubes instead of two. This extended air heating surface shows less efficiency of heating per square foot presented than did the air heater of the water tube boiler. In the Hoadley tests the average heating of the air shows about 300 degrees increase in temperature above the entering air, which is equivalent to a rise of 0.132 degree per square foot of air heater surface in the heater.

In his general summary of results Mr. Hoadley shows that when using bituminous coal (really a semibituminous Cumberland coal) only the concentric tube air heater was used, the improved heater as well as the concentric tube heater being both used with anthracite. Extracts from this summary are as follows:

	Boiler without air heater.		Boiler with concentric tube air heater.		Boiler with single tube air heater.
	Anthracite.	Bituminous.	Anthracite.	Bituminous.	Anthracite.
Steam gauge pressure above atmosphere, lbs. per square inch.	47.54	47.30	54.40	64.40	42.50
Pounds of water evaporated from and at 212° F. per pound of coal, days and nights	10.51	10.58	10.81	11.54	11.12
Water evaporated from and at 212° F. by day, per pound of coal burned during days and nights.	9.34	9.22	10.00	10.72	10.77
Mean temperature of external air, days	78.3°	71°	34°	34.2°	49°
Temperature of air supplied to furnace	78.3°	71°	337.7°	349.5°	334°
Temperature of escaping gases	368.3°	376.9°	189°	196°	164°
Gases cooled by abstractors	0°	0°	207.9°	201.4°	213°
Air warmed by abstractors	0°	0°	303.7°	315.5°	285°
British thermal units carried off in gases per pound of coal, days	1,576	1,835	866	1,092	661
Efficiency corrected for difference in temperature of external air, and difference in time of banking fires	68.87	64.61	78.18	77.59	81.43
Difference of efficiency: Points gained by warm blast, over Pacific boiler, cold blast	...	...	9.31	12.98	12.56
Ratio of gain to the larger quantity ($\frac{9.31}{78.18} = 11.9$ % &c.)	...	...	11.9%	16.7%	15.4%
Ratio of gain to the smaller quantity ($\frac{9.31}{68.87} = 13.5$ % &c.)	...	...	13.5%	20.1%	18.2%

"The power consumed in driving the blower is about 1 per cent. of the whole power produced by the boiler in combination with a good steam engine.

"It therefore appears that the net saving effected by the warm blast was from 10.7 to 15.5 per cent. of the fuel used with cold blast, which is the same thing as to say that discontinuing the warm blast would cause an increased consumption of fuel equal to from 12.3 to 18.9 per cent. of the quantity used with hot blast. Broadly stated, the gain is 10 to 15 per cent."

In this case we see a saving in economy resulting from the use of an apparatus somewhat expensive and troublesome to keep in efficient working order, and it is due to these facts that this apparatus, notwithstanding its proved economy, has not come into general use.

In addition to the above recorded tests, I have found a statement made by Mr. Bennis (the inventor of a well-known English stoker) regarding a test made with 50 feet of 2-inch piping heated red hot. Air was passed through this pipe at the rate of 1000 feet per minute, entering at 60 degrees F., and its temperature at the point of discharge was found to average about 120 degrees F. This is equivalent to a rise in temperature of about 0.75 degree per square foot of air pipe surface.

With these statements of tests before us, the fallacy of economy claims made by many manufacturers of air preheating devices presenting very little surface to the hot gases of a boiler furnace or discharge gases becomes very apparent, and, although the theoretical gain in economy due to preheating air for combustion is quite appreciable, it is seldom obtained in practice with simple and inexpensive apparatus.

Observation has taught, however, that preheated air for furnace use has an appreciable effect on smoke abatement, providing its temperature is materially increased, and here is where its best results must be looked for.

Of all methods for introducing secondary air to the furnace the open furnace door is probably the commonest means in use. Thus, with ordinary boiler settings we see the fireman (who understand his business) leave his furnace door partially open immediately after stoking his fire with bituminous coal.

As the dull red flame (which first appears when the fresh coal begins to ignite) commences to change to a bright red he closes his door somewhat further. As the flame passes into an orange color, then again when it passes into a yellow, he continues to gradually close the door, and by the time it passes an incandescent state and begins to practically disappear, he has his door closed tightly and by this means he reduces the smoke delivery from his furnace to the extent his facilities will allow.

In some furnaces, where the limited grate area forces the burning of an excessive amount of coal per square foot of surface, it may be necessary to have a constant flow of secondary air over the fire bed to suppress smoke and, in a measure, to promote economy. In such cases permanent openings through the door or around the furnace settings should be provided, although such openings should be capable of adjustment to suit the varying conditions of firing and the different grades of fuel burned.

Some furnace doors are fitted with circular registers or sliding shutters which, when wide open, will supply the maximum needed secondary air supply (right after firing), and then these registers are easily closed gradually as the green coal burns to a coke.

Such arrangements are an improvement on the partially opened door, as they tend to split up the air entering the furnace, instead of allowing it to enter in an unbroken bulk, which does not allow it to mingle freely with the combustible gases.

Nearly all furnace doors have what is known as a door lining, sometimes made of fire brick and at other times made of one or more cast iron plates. Such linings receive the intense heat of the furnace and thus furnish a protection to the outer part of the door.

With the cast iron linings a circulation of air is usually allowed to pass between the door front and its lining, thus protecting the former still further.

When secondary air is admitted through ventilators

or slides it is slightly warmed between the door and its lining, and it escapes from behind the lining plate through small holes or else from under its bottom. In the former case the air is split up into a number of small streams, while the advantage claimed by the makers of the bottom air escape door is that the air is delivered in a thin, flat stream upon the hot dead plate, whence it passes to the grate bars, rising with the combustible gases and mixing with them as they ascend to the upper part of the furnace. Such a door is shown in Fig. 1.

A special door depending upon this method of delivering its secondary air, which seems to be quite a favorite with users of Southern Illinois coal (running between 30 and 40 per cent. in volatile matter) is similar to the one shown in Fig. 11.

The door shown in this illustration was patented by

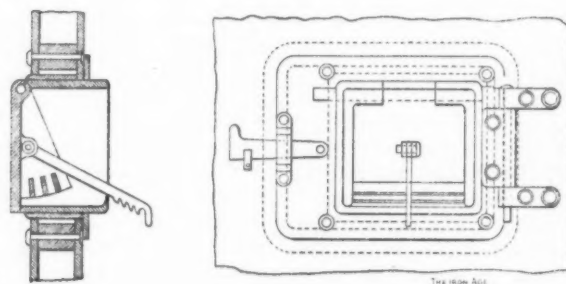


Fig. 11.—The Beattie Patent Door.

Beattie, in 1858. It consists of a frame like door, with what might be called an adjustable lining swung from a top hinge. The entire door is opened for firing, and then when the door is closed the "lining" is swung open to its fullest extent, admitting its largest possible quantity of secondary air, and as the combustion of the green coal proceeds the fireman gradually closes the flap, one notch at a time, until the door flap reaches the position shown in Fig. 11, when it is entirely closed.

There have been many devices invented to perform the gradual closing action of the secondary air openings in furnace doors, and I will show a few old devices of this kind which the reader may compare with the more modern inventions on the market, most of which depend upon these principles of operation.

In 1853 Prideaux patented the door shown in Fig. 12, the openings in which consisted of a number of re-

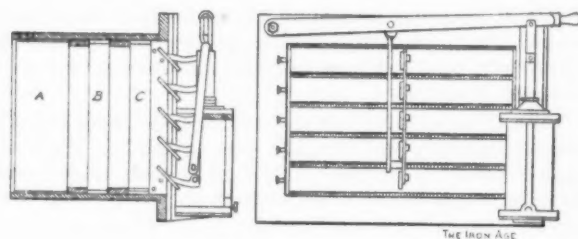


Fig. 12.—The Prideaux Patent Door of 1853.

volving slats, the same as those of a Venetian blind. After firing fresh coal, these slats were opened by raising the lever over the top of the door. At the same time a piston was raised in the cylinder shown at the right of the door. The cylinder contained water and its piston held a valve which opened readily as it was raised, allowing the water above the piston to flow beneath it. As the piston started to descend (and close the slats in the door) this water valve automatically closed tightly, allowing the weighted piston to drop only as fast as the water below could flow upward through a small hole in another part of the piston. The size of this hole could be increased or diminished by turning a screw, thereby regulating the time of closure for the slats.

In 1855 Cliff patented the special door shown in Fig. 13. This door was provided with a slide opening to admit secondary air. As the door was opened the hol-

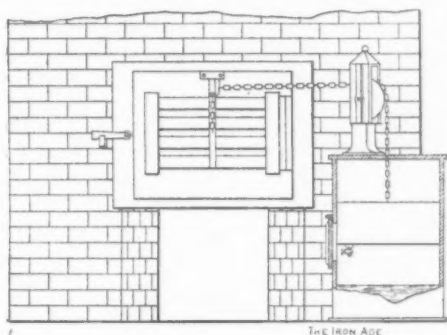


Fig. 13.—The Cliff Patent Door.

low cylindrical piston in the adjoining cylinder dropped into the water in the bottom of the cylinder, which water ran through a bottom opening into the piston.

As the door was closed after firing the attached chain caused the piston to rise, carrying its load of water with it. The weight of the water and piston caused the shutter to move up and open wide, and as the water ran out of the piston the weight of the slide (and a counter weight) caused the slide to move down slowly, thus gradually closing the openings until, when the piston was empty, the secondary air supply was entirely cut off.

In 1870 Auld patented the special door shown in Fig. 14. This door consisted of a frame, carrying a central flap or disk revolving on two side hinges. A cross rod

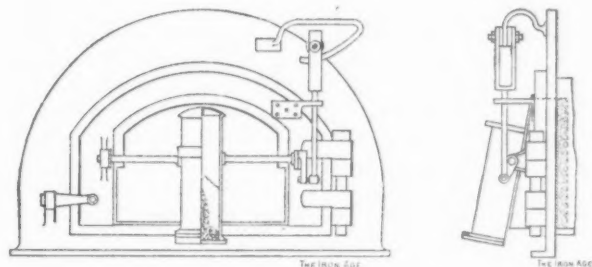


Fig. 14.—The Auld Patent Door.

supported on these side hinges carried a cylinder filled with sand, which was attached to the door flap. As the door is opened a side lever carried on a cam like runway (above the door) operates upon the revolving flap and sand box, causing them to be turned upside down. When the door is closed again the sand runs from its new position (in what was formerly the top of its cylinder) back to the original bottom of the cylinder, and as the center of gravity of the combined flap and sand cylinder is thus changed the flap of the door is gradually turned until it entirely closes the opening through the door and resumes the normal position shown in the illustration.

In 1870 Prideaux patented another method of introducing secondary air into the furnace, as shown in Fig. 15, which device provides for its admission over the top of the furnace door, and it will be seen that this air is not only distributed behind the door lining, but it is admitted also behind a lining covering the whole furnace front. This design of front is applied to an internally fired boiler, such as a Lancashire or Galloway boiler.

It will be seen that Prideaux provides numerous narrow slits in the lining, through which the air passes, thereby cutting it up into thin streams to enable it to mix more thoroughly with the combustible gases. Between the boiler front and the lining to the right of the fire door will be seen a piston, which operates the flap or shutter covering the air opening. This is arranged in connection with the door so that when the door is

opened the piston in the cylinder is raised, its piston rod at the same time opening the flap. After firing and closing the furnace door the flap is gradually and automatically closed by the piston's descending in the cylinder, as described before (in connection with Fig. 12).

Another method of introducing secondary air into the boiler furnace is by conducting the air through passages built in the masonry.

A device of this kind has already been described and illustrated in Fig. 6, under the heading of "Various Arrangements of Brick Arches and Furnace Walls." It

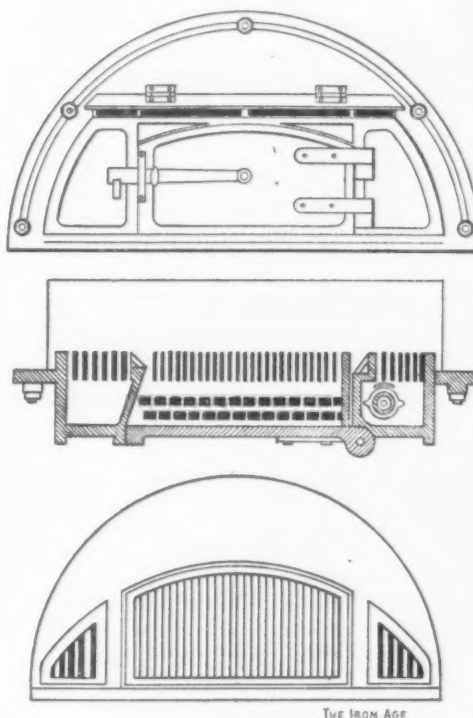


Fig. 15.—The Prideaux Patent Door of 1870.

consists of a hollow brick arch (or double arch) built over the furnace; discharging the air drawn between the two arches (by the chimney draft) into the rear of furnace, from which point of discharge it descends to the throat way formed between the regular bridge wall (at the rear of the fire bed) and the hanging bridge wall, where it mixes with the combustible gases which are burned in the combustion chamber at the rear of the furnace.

Another similar device is described under the same heading, where a similar double brick arch arrangement is built over the fire bed, but the lower arch, instead of terminating before reaching the end of the furnace, is continued to a rear wall (or arch) and thereby closed.

The secondary air, in this last arrangement, escapes into the fire chamber through openings in the lower arch, and the general method of operation then becomes identical to that just described.

By use of either one of these systems it will be seen that the air is heated to an appreciable extent, and the former furnace (tested by the writer), using a coal producing considerable smoke (when burned in an ordinary furnace setting), was found to handle this fuel with practically no smoke production, at the same time being very economical.

A little incident connected with the use of this furnace (shown in Fig. 6) may be interesting to show how illy adapted such a furnace is to burning an entirely different grade of fuel.

When visiting this plant at one time I found evidences of very intense heat (for a boiler furnace) in both brick work, boiler front and doors, the latter having the graphite paint burned off and presenting the appearance of iron that had been heated to redness.

On inquiry I found that the owners had found the furnace so satisfactory that they thought they could profitably burn coke from the neighboring gas house, which

they owned. The result was almost disastrous, as described above, owing to the hotter fire resulting from the coke fuel and the concentration of the heat by the furnace covering arch.

Evidences of great heating were also visible on the grate bars, the dead plate and the cast iron arch over the furnace doors.

Between 1840 and 1850 C. Wye Williams, who did much experimental work in the development of boiler furnaces, designed the method shown in Fig. 16 for introducing secondary air into the furnace. This design

cheek plates (or tiles) let into the side walls of the furnace, the combustion chamber or the rear of the bridge wall. The secondary air was delivered through these perforations after passing through passages in the brick work, where it became more or less heated.

This form of secondary air supply has been very popular ever since and was largely employed about 20 years ago by an American concern known as the Jarvis Furnace Company.

Their furnace is illustrated in Fig. 17, showing the perforated side cheek tiles in the side wall and also a

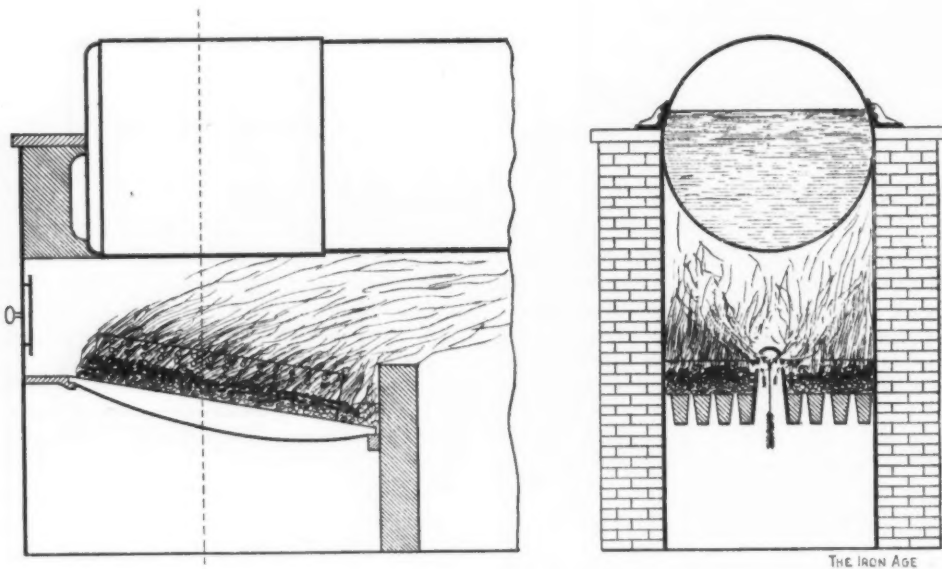


Fig. 16.—The Williams Method of Introducing Secondary Air Into the Furnace.

was developed for the purpose of securing very rapid combustion in the fire box, on account of lack of room in the rear for a combustion chamber of sufficient length.

It will be seen that the grates were evenly divided on each side of the furnace into two parts, and a bent plate of wrought iron was inserted between them. Fifty-six 1-inch holes were punched in the upper part of this plate and the air admitted to the fire chamber was

perforated tile in the top of the bridge wall. The secondary air for this furnace was led through passages behind the furnace linings and after more or less heating issued from the perforated tiles shown.

Another furnace using perforated side cheek tiles is shown in Fig. 18. This was patented about 20 years ago, and instead of heating the secondary air by passing it through hot passageways in the brick work, it draws its air from the rear of the boiler into two of the lower

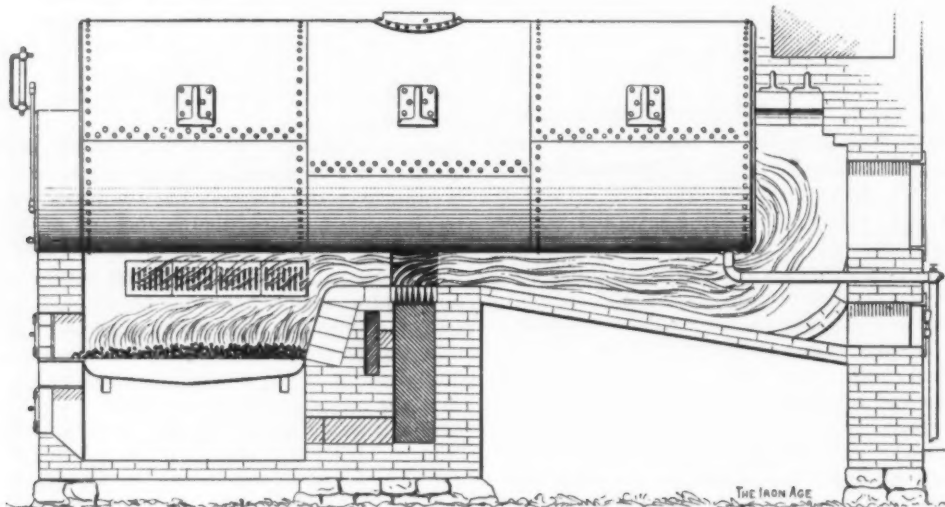


Fig. 17.—The Jarvis Furnace, Having Perforated Side Cheek Tiles.

somewhat heated. Arrangements were made to carry a 6-inch fuel bed.

The object sought for was gained, and the furnace proved fairly economical and smokeless, but the life of the air supplying device was comparatively limited.

Mr. Williams was a great advocate of supplying secondary air through perforated plates or tiles (to properly split up the air into small streams), and one of his most successful designs of this kind consisted of perforated

tubes of a horizontal tubular boiler, whence it is conducted by piping into the space behind the side tiles of the furnace.

The heated air thus obtains its elevation in temperature by robbing the water in the boiler of some of its heat.

A common method of distributing heated air behind the furnace into the combustion chamber is shown in Fig. 10, (the Woodcock furnace). It will be seen that

the air passes through the side wall of the boiler into the spaces provided in the two hollow bridge walls, which are constantly heated by the combustion around them. The chimney draft draws the air from these spaces into the combustion chamber in small circular streams, where it mixes with the furnace gases and continues their combustion.

Some rear combustion chambers are also provided with perforated cheek plates in their side walls, while

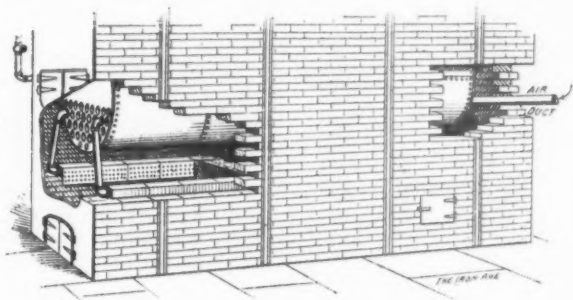


Fig. 18.—Another Form of Furnace with Perforated Side Cheek Tiles.

many designs do not attempt to split up this secondary air for the combustion chamber, but introduce it in solid unbroken streams, which is bad practice.

The Lovering Drawback Bill.

WASHINGTON, D. C., October 28, 1902.—The friends of the Lovering bill have finally completed the organization of a committee of manufacturers, formed for the purpose of advancing the interests of the bill at the coming session of Congress, and the correspondent of *The Iron Age* is able to announce the names of those who will serve upon it. The committee is comprised of five members and includes Edwin Tatham of Tatham & Brothers, manufacturers of lead products, of New York, who will act as chairman of the committee; Andrew G. Webster, president of the New England Shoe and Leather Association, of Boston, Mass.; Walter Wood of R. D. Wood & Co., engineers and iron founders, of Philadelphia; George L. Underhill of the Selby Smelting & Lead Company of San Francisco, and John M. Peters of W. J. Matheson & Co., Limited, manufacturers of white lead, paints, &c., of New York. N. M. Kline of the Smith, Kline & French Company of Philadelphia, manufacturers of drugs, has been invited to serve as a member and will probably consent to do so.

The personnel of this committee furnishes an excellent illustration of the wide scope of the movement in favor of more liberal drawback laws. The iron and steel industry, the manufacture of lead products in various forms, from smelting to the production of white lead, the shoe and leather industry, with its ramifications in almost every State, together with the manufacturing and wholesale drug trade, represent a very large portion of the entire trade of the country and an even greater part of our export business. Some care has been exercised in the selection of the committee to give it a geographical distribution so as to include the leading commercial centers. Boston, New York and Philadelphia represent the East, and San Francisco stands for the Pacific Coast, the manufacturing interests of which have increased greatly in recent years. The work of the committee will not be confined to the interests of any particular interest or section, but the effort will be to induce the Ways and Means Committee to report the Lovering bill at the earliest possible date and ultimately to secure the passage of the measure at the coming session.

The interest of the iron and steel industry in a more liberal drawback law has increased very materially during recent months, chiefly, it is believed, because of the shortage in domestic raw material, which has made it necessary to import material to fill export orders. Defects of the present law have come to light in this emergency to such an extent as to leave no doubt as to the

desirability of its modification. Manufacturers who have been obliged to import their raw materials at the last moment, after having exhausted every attempt to buy them in the home market, have rarely been able to take advantage of the rebate to which they would be entitled under the present law. In some cases they have been obliged to accept telegraphic offers of imported material already in the United States, and the necessity for promptly working it up has precluded the allowance of drawback, which must be arranged for in advance through the rather tedious processes of the customs service. The Lovering bill would afford facilities for such transactions and drawbacks could be arranged for on very short notice.

The impracticability of operating large plants under the present law was fully set forth to the Ways and Means Committee by F. W. Wood of the Maryland Steel Company, who explained that a large rolling mill might be working one day on an order of domestic rails, the next on foreign rails and the third day again on domestic rails. It would be impossible to change mixtures and to keep records which would enable the superintendent of the plant to make an affidavit in good faith to the effect that all the materials in a given quantity of product were imported, although he might know that an equal quantity had actually been obtained from abroad. The ability to do away with the special plant or furnace or storage yard for export orders would materially reduce the cost of production and enable American manufacturers to take business which they are now obliged to decline.

The interests of the lead trade will be cared for by Mr. Tatham, who is to serve as chairman of the committee. He is especially interested in the amendment of the bonded warehouse provisions of the present tariff law, which have recently been the subject of much discussion between customs officials and manufacturers. In a statement to the Ways and Means Committee Mr. Tatham pointed out that American manufacturers could not do an export business unless they could get back all the duties paid on their imported materials, "because the margins are so small and competition is so keen that if the Treasury retains any part of these duties, or makes their repayment very difficult, the handicap is too much for the American manufacturer."

Congress will reconvene in five weeks, and Representative Lovering will then take up his measure vigorously with the Ways and Means Committee. He hopes to secure a favorable report before the Christmas holidays in order to get the measure through the House and Senate during the coming session, which will terminate on March 4 next. The special sub-committee of the Ways and Means Committee appointed by Chairman Payne to consider the bill will be asked to take it up before Congress meets, in the hope of expediting a favorable report to the full committee.

W. L. C.

According to the annual report of Capt. N. M. Brooks, Superintendent of Foreign Mails, Washington, D. C., the record for the fastest time made by a mail steamer between New York and Southampton last year belongs to the "Deutschland" of the Hamburg-American Line, with 147.2 hours. The "Kronprinz Wilhelm" of the North German Lloyd made the next best time, 149.9 hours. The "Lucania" of the Cunard Line made the trip from New York to Queenstown in 166.1 hours, and the "Oceanic" of the White Star Line the same distance in 167.2 hours. "La Savoie" of the General Transatlantic Line made the fastest trip between New York and Paris via Havre, 173 hours. Other fast trips were: "Coptic," San Francisco and Yokohama, via Hong Kong, 657.6 hours; "American Maru," San Francisco and Yokohama and Hong Kong, 666 hours; "City of Peking," San Francisco and Yokohama and Hong Kong, 624.2 hours; "Glenogle," Tacoma and Yokohama and Hong Kong, 647 hours; "Tessa Maru," Seattle and Yokohama, 370 hours.

The fall meeting of the American Society of Mechanical Engineers has been set for December 2 to 5 at New York.

Notes from Great Britain.

Militarism and Business.

LONDON, October 11, 1902.—The British nation is at last subsiding into the quiet consciousness that the military operations in South Africa have not only been a profound blunder both from the point of view of imperial interests and of commercial affairs, but also are an indication of a deeply rooted error in the fabric of European society. It is now perceived that militarism is far too heavy a handicap for Europe to carry if it is to compete successfully with America in the commercial war of the future. It is very significant to note the growing desire on the Continent of Europe for a cessation of the constant increase of military and naval expenditure, and, indeed, for a reduction of those vast standing armies which are crushing industry and commerce. In Great Britain the feeling is not so acute, because the soldier is not so omnipresent. But an expenditure officially admitted to be £230,000,000, and which actually is not much less than £400,000,000, in South Africa, bringing with it not only trouble and vexation and endless misery, but no palpable commercial results, is a lurid fact, and will become in the near future a factor in practical politics.

The ex-Chancellor of the Exchequer, Sir Michael Hicks-Beach, freed from the cares of office, with greater freedom and less responsibility, has been speaking out with no uncertain voice upon the stupendous burden of taxation which this country now has to carry. In John Bright's day an annual budget of £70,000,000 was considered to be beyond the bounds of reason. Our budget to-day, apart from the abnormal condition created by active warfare, is not much less than £130,000,000. All this is a tax upon industry, which is now being acutely felt. The difficulty confronting the Englishman is that he does not know where to begin in the way of retrenchment. He won't hear of any reduction of the navy, and when he compares the numerical strength of his army with that of France or Germany he at once becomes fearsome, and in consequence won't reduce his army either. None the less, he feels the burden; and it is not easy to be borne.

The Production and Consumption of Coal.

At a time when there is a coal famine in the United States, it may be well to set out clearly what are the world's resources of coal—that is, coal that is actually produced. It is therefore fortunate that this week there has come to hand a statement relating to the production and consumption of coal in the principal countries of the world. The figures given in this statement refer generally to the year 1900, but in some cases to 1901. From this statement I extract the following figures, giving the production of coal in the five principal coal producing countries during the past three years:

	1899.	1900	1901.
United Kingdom, tons*	220,095,000	225,181,000	219,047,000
Germany, tons†	101,640,000	109,290,000	108,417,000
France, tons†	32,256,000	32,721,000	31,613,000
Belgium, tons†	22,072,000	23,463,000	22,074,000
United States, tons*	226,554,000	240,966,000	261,873,675

*Tons of 2240 pounds. †Metric tons of 2204 pounds. ‡Provisional figures.

It will thus be seen that, with the exception of the United States, there has been some slight shrinkage of production in the other countries. The total known coal production of the world, exclusive of brown coal, is now nearly 700,000,000 tons (of 2240 pounds) per annum, of which Great Britain produces rather less and the United States rather more than a third. As compared with population the production of coal in Great Britain still surpasses the United States. It amounted to 5½ tons per head of the population in 1900, and 5¼ tons in 1901, while the United States is just over 3 1-3 tons per head. In Belgium it is 3 1-3 tons, in Germany rather less than 2 tons, and in France about 4-5 ton per head. As to the value of the coal produced, I give in tabular form the average value per ton at the mine for the year 1900:

United Kingdom.	Germany.	France.	Belgium.	United States.
Per ton.	Per ton.	Per ton.	Per ton.	Per ton.
s. d.	s. d.	s. d.	s. d.	s. d.
10 9½	8 10	12 0¼	13 11¼	5 3¼

The averages above cited all show a rise in price on the previous year, amounting to \$1 in Belgium, 72 cents in Great Britain, 48 cents in France, 24 cents in Germany and 14 cents in the United States. But last year (1901) there was an average fall in Great Britain from 10 shillings 9½ pence to 9 shillings 4¼ pence. The provisional figures for Germany and the United States indicate a rise in both countries. A comparison of prices in Great Britain and the United States between the last three years and the same period a decade ago is interesting reading. The figures work out as follows:

United Kingdom.	United States.	United Kingdom.	United States.
Per ton.	Per ton.	Per ton.	Per ton.
s. d.	s. d.	s. d.	s. d.
1889.... 6 4¼	5 3½	1899.... 7 7	4 8¼
1890.... 8 3	5 2¼	1900.... 10 9¼	5 3¼
1891.... 8 0	5 3½	1901.... 9 4¼	5 3

A few statistics cannot fail to interest readers in the United States, for they deal with the exports of coal and show clearly enough where coal can be obtained at the present moment. The following statement gives particulars of such excess over imports in the year 1900 for the following countries.

	Imports.	Exports.	Excess of exports.
	Tons.	Tons.	Tons.
United Kingdom.....	10,000	58,405,000	58,395,000
German Empire.....	8,034,000	18,055,000	10,021,000
United States.....	1,903,000	8,295,000	6,392,000
New South Wales.....	3,000	3,370,000	3,367,000
Belgium.....	3,600,000	6,939,000	3,339,000
Japan.....	99,000	3,350,000	3,251,000
British India.....	143,000	543,000	400,000
Natal.....	63,000	95,000	32,000

It is sometimes said that the consumption of coal per head of the population is the best indication of national wealth. There is a good deal to be urged in favor of this theory, both from the point of view of manufacture and of social well being. Of course, the different habits of house warming to some extent vitiate the argument, but such as it is it is as well to bear it in mind in comparing the per capita consumption of coal in the large countries of the world, as shown in the following table:

United Kingdom.	United States.	Belgium.	Germany.	France.	Austria-Hungary.†	Russia.‡
Tons.*	Tons.*	Tons.†	Tons.†	Tons.†	Tons.†	Tons.†
3.89	3.29‡	2.81‡	1.71‡	1.15‡	0.40	0.15‡

*Tons of 2240 pounds. †Metric tons of 2204 pounds. ‡In 1900. §Provisional figures.

British Metal Exports to America.

During the past nine months Great Britain has exported to America 281,144 tons of pig iron, valued at £1,024,022. During the first nine months of the year 1901 the exports of pig iron only amounted to 33,365 tons, valued at £205,297. Accepting, therefore, 33,000 tons as the average export, it will be seen that over a quarter of a million tons of pig iron have reached the United States over and above the average demand. Looked at in the cold light of figures, this, after all, does not amount to so very much, although, of course, there is a large quantity of pig iron still on order, to be delivered in the next few months. I still adhere to an opinion previously expressed that while no doubt large orders have been given by Americans, their significance and importance have been exaggerated for bulling purposes in this country. The figures for the leading items for the month of September I have made out to be as follows:

Description and port of shipment.	Quantity.	Value.
	Tons.	£
Old iron.....	4,355	14,590
Pig iron: Liverpool.....	13,158	67,770
Hull.....	2,220	10,010
Glasgow.....	7,915	25,279
Barrow.....	8,500	26,225
Hartlepool.....	4,400	13,525
Middlesbrough.....	25,496	72,218
South Shields.....	4,107	12,293
Sunderland.....	500	1,250
Swansea.....	81	725
Leith.....	250	719
Ardrossan.....	3,000	8,730
Dundee.....	200	500
	69,827	239,244

Bar iron.....	429	7,137
Rails.....	245	5,707
Galvanized sheets.....	128	1,535
Tin plates and sheets.....	3,380	47,727
Cast and wrought iron.....	121	2,865
Steel billets.....	5,856	63,780
Iron and steel manufactures.....	26	6,316

British Shipbuilding.

On all hands it is agreed that the shipbuilders are encountering a bad time. In this respect the Clyde is much more favorably situated than is the northeast coast. Scottish shipbuilders have still a large number of orders in hand, and have been fortunate to snap up any orders that were going. The depression on the northeast coast is, however, being felt severely, and an early reduction of wages is inevitable. This week the joint shipbuilders on the Tyne, Wear, Tees and at the Hartlepoons intimated that, owing to the severe depression in trade they had decided to give notice to platers, countersinkers, helpers, red leaders, laborers, &c., employed in the associated shipyards for a reduction of 5 per cent. on piece rates and 1 shilling per week off time rates of 24 shillings and over and 6 pence per week in time rates under 24 shillings, to take effect on October 29 next. No fewer than 50 empty berths are to be found in the shipbuilding yards on the northeast coast, and while of course the men do not like the reduction it seems probable from present appearances that they will accept it as inevitable. Following is a table of new ships delivered to foreign purchasers during the last month, giving the ship's name, port, destination, flag and gross tonnage:

"Achala," Stockton, Smyrna, German.....	1,732.88
"Alexandra," East Cowes, Isle of Wight; Freetown, Sierra Leone; British.....	50
"Aragon," Sunderland, Sevilla, Spanish.....	1,933.89
"Beatrice," Howden Dyke, Yorkshire; St. John's, N. F.; British.....	128
"Gracchus," Jarrow-on-Tyne, Melbourne, British.....	3,749.85
"Ingane," Aberdeen, Durban, British.....	215.81
"Ittersum," Port Glasgow, Cronstadt, Dutch.....	1,309.31
"James Patterson," South Shields, Melbourne, British.....	247.49
"Ker-Behan," Aberdeen, L'Orient, French.....	179.04
"Klama," Glasgow, Sydney, British.....	358.11
"King Edward," Hull, Quebec, British.....	355.02
"S. Margherita," Dumbarton, Tocopilla, Italian.....	1,929
"Midland Queen," Dundee, Montreal, British.....	1,993
"New York," Jarrow-on-Tyne, Rotterdam, Dutch.....	7,049.77
"Normand," West Hartlepool, Christiania, Norwegian.....	2,121
"Prometheus," Sunderland, Drammen, Norwegian.....	1,715.07
"Proteus," Sunderland, Drammen, Norwegian.....	1,689.47
"Sarota," East Cowes, Isle of Wight; Lakoja, N. Nigeria; British.....	231
"Sir Charles Elliott," Paisley, Cape Town, British.....	328.48
"Sybil," Falmouth, St. John, Cape Colony; British.....	48.6
"Vallant," East Cowes, Isle of Wight; Akassa, S. Nigeria; British.....	227.07

Ore in Sight.

It will be within the recollection of your readers that some time ago J. W. Kendall read a paper before the Institution of Mining and Metallurgy on the subject of "Ore in Sight." As the outcome of this paper a committee was appointed with instructions to define this term. After full inquiry the committee has come to the following decision: 1, That members of the institution should not make use of the term "ore in sight" in their reports without indicating in the most explicit manner the data upon which the estimate is based, and that it is most desirable that estimates should be illustrated by drawings; 2, that as the term "ore in sight" is frequently used to indicate two separate factors in an estimate—namely, *a*, ore blocked out—that is, ore exposed on at least three sides within reasonable distance of each other—and, *b*, ore which may be reasonably assumed to exist though not actually "blocked out," these two factors should in all cases be kept distinct, as *a* is governed by fixed rules, while *b* is dependent upon individual judgment and local experience; 3, that in making use of the term "ore in sight" an engineer should demonstrate that the ore so denominated is capable of being profitably extracted under the working conditions obtaining in the district; 4, that the members of the institution be urged to protect the best interests of the profession by using their influence in every way possible to prevent and discourage the use of the term "ore in sight," except as defined above, and the council also strongly advise

that no ambiguity or mystery in this connection should be tolerated, as they (the council) consider that such ambiguity is an indication of dishonesty or incompetency.

The Australian Iron Industry.

It has already been reported in *The Iron Age* that the Australian Government has been inquiring into the possibilities of encouraging the local iron industry. A circular was addressed to the various State governments inquiring whether the iron industries of the several States would be likely to receive benefit from the Bonus bill, which was intended to stimulate the iron trade. Victoria replies that there is no probability of any advantage being taken of the proposed bounties. New South Wales says, rather enigmatically, that the State Government favors both a bonus on production and a protective duty, but that the promotion of the industry is "a matter for private enterprise." The former part of the reply is remarkable considering that the people of New South Wales are for the most part in favor of free trade. Queensland replies, like Victoria, that there is no sign of the bill, if it should be passed, doing anything in the way of encouraging the iron industry. South Australia answers that unless coal deposits should be discovered which can be utilized in smelting and manufacturing the iron ores of the State there is no intention to establish iron works. Tasmania also reports that no movement of this kind is likely to be set on foot for many years to come. From Western Australia the reply is that the bill as framed will have no effect there at present. It appears, therefore, that the measure, if it should be passed, will prove all but fruitless.

Engineering Prospects in South Africa.

B. H. Morgan, the engineering trade commissioner who went to South Africa to inquire into the prospects of trade there on behalf of Great Britain, is back with his colleagues. At a meeting of the South Africa Trade Committee held this week, Mr. Morgan, in submitting his report, stated that there were enormous opportunities for trade in engineering lines, and particularly in machinery utilized in dock and harbor construction, railway extension, mining and agricultural work. The harbor work includes contemplated improvements and work in progress at Saldanha Bay, Cape Town, Simonstown, Port Elizabeth, East London and Durban, for which an enormous amount of machinery has still to be purchased. New railway lines and extensions are in contemplation and being proceeded with in Cape Colony, Orange River Colony, Transvaal and Natal, and he explained and laid before the meeting special drawings showing such improvements and extensions, and the class of machinery that would be required in each case. In regard to the mining industry of the Rand, he was of opinion that as soon as the political atmosphere cleared enormous development would take place and a large quantity of mining and electrical machinery of all kinds would be required. Agriculture is already making headway in every direction, and the demand for machinery and implements was very large and would increase as the country settled down. Similarly bright prospects were held out to manufacturers of steam engines and general tramway and lighting equipment for towns, and he dealt in detail with the prospects of trade in iron and steel constructional work. He found that German and American competition was everywhere very keen, and although prospects of trade were so good business could only be obtained by enterprise and "pushfulness" and a thorough appreciation of the requirements of the market. He was surprised at the anticipated methods of business which British manufacturers adopted in dealing with this market, and he hoped that the exposure of such methods in his report would open the eyes of British manufacturers and traders and help to bring about a better condition of things.

The Mineral Production of India.

The official report of the Government of India on the mineral production of that country last year is about to be made public. When it is it will be found that the output of coal has increased from 3,540,000 tons in 1895 to 6,636,000 tons in 1901. Indian coal is now extensively, and in some places exclusively, supplied for the rail-

ways, coasting and river steamers, mills and factories, but the conditions of transport are, it seems, not yet sufficiently developed, though they are being greatly improved to permit of the exclusive use of Indian coal for industrial purposes. The imported coal, which has averaged 280,000 tons annually the last five years, is chiefly landed in Bombay and most of it is British, though a small proportion comes from Japan.

A Loss to the United States.

In consequence of the abnormal condition of the American market, I hear that certain American firms have failed to guarantee the delivery of 20,000 tons of rails and other material within the required time ordered by the Russian Government. The commission has, in consequence, been placed with the Creusot Company, who, being unable to execute it wholly, are distributing the order in 5000-ton portions. As large orders of other kinds were attached to this one the loss to the American firms concerned must be exceedingly heavy.

The Week's Market.

The most important event this week in the metal market has been the quarterly meeting of the Midland Iron trade. Unusual activity was observable and a strong effort was made to lever up prices, but without much success. The feeling of hopefulness arose in great part from the large orders which have recently come to hand from America for immediate coal delivery. But the bulls made little headway, and, after all, the prevailing feature was a distinct disinclination on the part of consumers to buy heavy quantities in view of the prohibitive price of raw materials. I have recently referred on two or three occasions to foreign competition. There can be no doubt that it is being severely felt in the British market. For example, Belgian open hearth steel bars are quoted at £5 4s.; No. 2 iron bars, £5, and beams, £4 10s. 6d., net, at Antwerp, in each case. There is undoubtedly a good deal of business being done with this Belgian material. The marked bar makers are in receipt of steady inquiry from the railway companies and dock yards, but engineers fight shy for the reason above stated.

During the week the pig iron market became easier. There was some expectation that the coal strike in America would be settled, and this had a distinctly bearish influence which was promptly counteracted by the information that the efforts at conciliation had failed. Prices finished up yesterday (October 10) for Glasgow warrants 57 shillings 9 pence, for Middlesbrough warrants 52 shillings 11½ pence. It will be observed that the Middlesbrough price shows a drop of 3½ pence on the week's prices. The main outstanding fact in connection with shipments is that at the present moment no less than 60 steamers have been chartered in Liverpool to convey coal to America. From Cardiff comes the information that American inquiries are chiefly confined to the cheaper sorts. From Glasgow a shipment is reported to Montreal of 5000 tons of Scotch coal at 9 shillings freight. It is needless to remark that this stiffening of the price of coal only adds another weight to the heavy burden felt by manufacturers in this country in their vain effort to obtain raw material at a remunerative price.

S. G. H.

Republic Iron & Steel Meeting.—At the stockholders' meeting of the Republic Iron & Steel Company, held in Jersey City, October 15, the following directors were elected: For the term ending 1905—August Belmont, Grant B. Schley, Geo. R. Sheldon, Wm. H. Hassinger, John Crerar. For term expiring 1904—L. C. Hanna, Geo. A. Baird. For term expiring 1903—Chas. H. Wacker. The only new member of the board is Mr. Wacker, who succeeds W. E. Taylor, resigned. Mr. Wacker is a prominent Chicago business man, whose wealth was acquired in the brewing industry. It is announced that the next statement of the company to be issued will cover the six months ending December 31, but that the statement will not be forthcoming before February.

Lake Ore Matters.

DULUTH, MINN., October 25, 1902.—The biggest shippers, so far as some of their mines are concerned, are pretty well over their season's business. As to others, they are somewhat behind, and will be obliged to move with considerable rapidity if they get down all ore scheduled. Some of the bigger mines are now about as follows with total shipments: Fayal, 1,300,000 tons; Mountain Iron, 1,200,000; Stevenson, 1,200,000; Adams, 1,250,000; Norrie and Chapin, each 900,000. Rates are higher and will probably advance somewhat more before the close of navigation. Stock piles have been moved that have been on dock for years, and the lakes will go into the winter with considerably less ore on hand, proportionately to shipments, than for several years. Some of these old stocks moved this year are of a class of ore that has been in the way for a long time.

Activity Among the Railroads.

Preparations are already well under way among upper lake transportation interests for the coming year, and very extensive betterments will be made to facilities, both of rolling stock and terminals. The purchases of ore cars and motive power made by Minnesota roads for the coming season have been noted before. Others are under consideration. As to docks, the Great Northern and Chicago, Milwaukee & St. Paul roads are planning extensive enlargements, and the latter road has already commenced construction. Whitney Bros., contractors, of Duluth, are driving the foundations for this dock, and will be through in December. Dredges are now cutting out a channel to the dock. The superstructure has been started and the dock will be ready very early in the spring. The Great Northern has not begun work and will probably be delayed, as usual.

Twenty years ago the Chicago, Milwaukee & St. Paul road was a shipper of ore, running its lines into the Felch Mountain district of the Menominee range. The road withdrew from ore traffic with the decline of these mines, consequent on their supposed exhaustion, and tore up its tracks into the district. It never re-entered ore traffic until less than two years ago, when it made arrangements for running into the Crystal Falls district and into other parts of the Menominee. Vigorous and active, it soon secured a fair share of traffic from the locations reached, and was obliged to extend its ore dock after one season. Now a second and more elaborate extension is to be made, and the road hopes to handle the coming year all the ore offered it, which was impossible during the present season. The Chicago & Northwestern had up to this time a monopoly of Menominee range ore, as well as the bulk of what came off the Gogebic, either to Ashland or to Escanaba. This made that road the largest ore shipping line in the world, far in excess of any of the Minnesota roads. The Felch Mountain district, that had been idle so long, is now shipping ore once more, G. A. St. Clair of Duluth having reopened the old Northwestern mine, near Metropolitan. Mr. St. Clair has several other properties in the immediate vicinity and is exploring them with, it is stated, satisfactory results. At the Northwestern mine he has shown up a considerable body of good ore and will make quite an output in another year. The report of the Inspector of Mines for Iron County, Mich., Crystal Falls and vicinity, shows a total production for the 12 months to October 1, 1902, of 1,148,000 gross tons. The only mines that made above 100,000 tons were the Crystal Falls, Hemlock and Bristol. Monongahela exploration has been closed by Jones & Laughlins, and will probably be abandoned for a long time.

The Snyder Purchases on the Mesaba Range.

W. P. Snyder of Pittsburgh, president of the Shenango Furnace Company, has, with his associates, been one of the most active men recently in securing ore lands on the Mesaba range, and they now have in hand a very large and valuable selection of properties. These have cost a large sum of money, but that they are worth far more than they cost goes without saying. The success of Messrs. Snyder, H. W. Oliver, Geo. Tener and C. A. Congdon, who were not among the early owners of the

Mesaba, but who entered most actively after the formation of the United States Steel Corporation, is an object lesson to others who have needed ores, but have not succeeded in getting them. This party have not been afraid to spend money, amounting to millions, to get what they wanted, and they have not only a large tonnage, but a tonnage of high grade and otherwise very desirable ores, some of them being probably the most easily reducible on the range. While these properties have not been fully explored, they probably contain considerably more than 60,000,000 tons of ore. Indeed, over 50,000,000 tons are already proved, and some of the properties are not fully explored.

The first of these properties was the Shenango, belonging to the Shenango Furnace Company, lying in the eastern half of the southeast quarter of section 22, the northwest quarter of the southwest quarter of section 23, 58-20, in all 120 acres. This property when taken nearly two years ago showed about 9,000,000 tons of good ore. Now 12,000,000 are proved up. For the 20-cent lease the sum of \$500,000 was paid. There is an annual minimum of 100,000 tons on this property, and so far no ore has been mined. Shafts are being sunk, and if no further trouble is met the coming year will see a large output. Joining this property to the northeast is the northeast quarter of the northwest quarter of section 23-58-20, the fee title to which is held by the Clairton Steel Company, of which Mr. Snyder is president, under their contract to supply with ore the Crucible Steel Company of America. There are something more than 4,000,000 tons in this property, of a very desirable grade, and the price paid for the fee was \$525,000. There is, of course, no minimum requirement on this land. This mine will be opened by the Minnesota Iron Company under an operating contract, and that company have certain allotments of ore from the mine, subject to the latter's option. Work has already commenced in opening this property for shipment another year.

Adjoining the Shenango to the west is the west half of the southeast quarter of section 22, which belongs to the Chemung Iron Company, consisting of Messrs. Snyder, Oliver, Tener and Congdon, and on which there are shown up some 5,000,000 tons of good ore. In the same township are the Monroe and Chemung leases, covering all the southeast quarter and the southeast quarter of the northeast quarter of section 28-58-20. The Monroe is a very large and valuable ore body, containing as now partially explored considerably more than 10,000,000 tons. The Chemung is nearly as large, and the two may be one of the very large mines of the entire range. These carry 25-cent royalties and large annual minimums. They have not been opened for mining and are still under exploration. In the Monroe some of the deepest ore on the Mesaba has been shown. These belong to the Chemung Iron Company. In section 4, town 58-17, are 55 acres belonging in fee to the Minnesota Commercial Loan Company, containing as far as known about 2,000,000 tons of ore, that are also under Chemung leases.

The Shenango Furnace Company have now closed the purchase of the lease of the Webb, 120 acres, covering the west half of the northeast quarter and the northeast quarter of the same section, 6-57-20, from the Fay Exploration Company of Duluth. This tract has been shown to contain 9,000,000 tons of ore and probably has much more. For this 25-cent lease, which carries a minimum of 100,000 tons a year, \$280,000 was paid. Still further west in township 57-22 there has just been closed the purchases of the east half of the southeast quarter of section 23 and the west half of the southwest quarter of section 24. These have been known as the Little and Hartley explorations. The Little 40 acres went to the Clairton Steel Company and will be mined by that company. They carry large minimums and at royalties of from 20 to 25 cents a ton. For these explorations about \$200,000 has been paid. Other lands are being explored that they may become the property of this growing interest. Still other negotiations are now pending that may add some small tonnages to the properties now held. All in all, this group of mines and explorations is one of the most im-

portant on the Mesaba, outside those of two or three of the largest steel making companies. Messrs. Congdon, Hartley and others also own the Onondaga Iron Company, who control an additional tonnage on the Mesaba range. A half interest is also owned by W. P. Snyder & Co. in the low grade siliceous mines of the Antoine Ore Company on the Menominee range, ownership being in combination with the Republic Iron & Steel Company. There may be 50,000,000 tons or more in this group alone.

The Buffalo & Susquehanna Iron Company, of which W. A. Rogers is head, have taken the lease on 80 acres adjoining the town of Hibbing and the Webb mine on the South and will open a mine there. The land was formerly under option to S. Dessau. It has been explored to show 11,000,000 tons, and probably contains considerable more, part Bessemer. The royalty is 25 cents. The minimum is 100,000 tons annually. The fee is owned by Alworth, Hull & Boring, and the lease was bought from Alworth, Agnew, Washburn & Cole for about \$300,000.

Death of Geo. R. Stuntz.

Geo. R. Stuntz of Duluth, who was the discoverer of ore on the Vermillion range in 1865, died this week, aged 82 years. He was a surveyor and engineer and led an exceedingly active life until recently. In 1865 he was led to make the long and tedious canoe trip to Lake Vermillion by the reports of a half breed, and found there the outcroppings of what afterward became the Lee and Breitung locations of the Minnesota Iron Company. In 1875 Stuntz made the first shot ever fired upon an ore ledge in the State in the endeavor to prove to Professor Chester of Hamilton College that there was a continuous ledge where he had made his first find. Chester was then on the Eastern Mesaba, engaged for Messrs. Stone, Spalding and others in an examination of the ore outcroppings in what are now townships 60-12 and 60-13. This was, by the way, the first exploration ever conducted on the Mesaba. In 1880, when G. C. Stone secured the co-operation of Charlemagne Tower and others, and the development of the Vermillion commenced, Mr. Stuntz surveyed the locations and was in charge of operations for three years. D. E. W.

A Novel Temporary Steam Plant.—The Cincinnati Planer Company, Cincinnati, Ohio, recently made some improvements in their works which required the installation of a new steam plant. To avoid the stoppage of the works they concluded to use a temporary plant which could only be placed on the sidewalk in front of the shops. This was done, although the works are located in a crowded part of the city. They used a 100 horsepower Erie City boiler, and a photograph received from the company shows the manner in which it was erected on the sidewalk, with a stack towering above the building. The company started to put the new boiler in place on Saturday, and on Monday morning they ran the works with the new steam plant. Not a moment was lost in the operation of the works, and the temporary boiler was used very satisfactorily for two weeks. By that time the permanent power plant was installed inside. The company have purchased a lot 40 x 150 feet, across the street from their present works, on which they will at once begin the erection of a one-story brick warehouse.

The National Steel Castings Company.—The National Steel Castings Company of Montpelier, Ind., are expected to resume operations November 19, possibly a week sooner, after a long suspension for general repairs. The National Steel Castings Company of Fort Wayne, Ind., recently incorporated with a capital stock of \$500,000, will locate their plant on the Fort Wayne, Cincinnati & Louisville tracks at Fort Wayne, Ind. As some of the stockholders connected with the Steel Castings Company of Montpelier are interested in the Fort Wayne factory, some confusion has arisen and has been the basis for the report that the Montpelier plant was to be removed to Fort Wayne. It is authoritatively stated, however, that no such move will be made. Both works will be run as designated.

The Fritz Memorial.

[With Supplement.]

On Friday evening, October 31, there will be held at the Waldorf-Astoria a banquet in honor of John Fritz of Bethlehem, Pa., to celebrate his eightieth birthday. The friends of Mr. Fritz have seized the occasion to announce the establishment of a John Fritz gold medal to be given for scientific or industrial achievements. It is proposed at the dinner to present Mr. Fritz with a cast of the medal as modeled by the artist, whereupon the original model will be destroyed.

Among the speakers at the banquet will be representatives of the four national engineering societies, of the army and navy, and of American and English iron and steel trades, the toastmaster being Colonel H. G. Prout, editor of the *Railroad Gazette*. It is expected that about 350 persons will be present at the banquet, and elaborate preparations have been made for it.

Early in the spring, at the call of S. T. Wellman of Cleveland, a number of prominent engineers and manufacturers met in New York to discuss the question of a suitable celebration of Mr. Fritz's eightieth birthday, the outcome of these meetings being the appointment of the following committee:

President, S. T. Wellman, Wellman-Seaver Engineering Company, Cleveland, Ohio.
 Treasurer, John Thomson, 253 Broadway, New York.
 Secretary, C. Kirchhoff, editor *The Iron Age*, New York.
 S. W. Baldwin, Pennsylvania Steel Company, Empire Building, New York.
 N. H. Heft, New York, New Haven & Hartford Railroad, New Haven, Conn.
 R. W. Hunt, The Rookery, Chicago, Ill.
 F. R. Hutton, secretary American Society of Mechanical Engineers, 12 West Thirty-first street, New York.
 C. Warren Hunt, secretary American Society of Civil Engineers, 220 West Fifty-seventh street, New York.
 J. C. Kafer, 247 Fifth avenue, New York.
 T. C. Martin, editor the *Electrical World and Engineer*, 120 Liberty street, New York.
 E. E. Olcott, 36 Wall street, New York.
 R. W. Pope, secretary American Institute of Electrical Engineers, 26 Cortlandt street, New York.
 H. G. Prout, editor the *Railroad Gazette*, 32 Park place, New York.
 E. G. Spilsbury, 45 Broadway, New York.
 Jesse M. Smith, St. Paul Building, New York.
 Ambrose Swasey, Warner & Swasey, Cleveland, Ohio.
 Oliver Williams, Bryden Horse Shoe Company, Catsauqua, Pa.

The organization was effected by the appointment of four subcommittees, as follows:

Medal Committee: C. Warren Hunt, chairman; F. R. Hutton, R. W. Pope, C. Kirchhoff.
 Finance Committee: John Thomson, chairman; Ambrose Swasey, Jesse M. Smith, E. E. Olcott.
 Dinner Committee: T. C. Martin, chairman; J. C. Kafer, H. G. Prout, E. G. Spilsbury.
 Invitations Committee: S. W. Baldwin, chairman; N. H. Heft, R. W. Hunt, Oliver Williams.

The task of designing the medal and cutting the dies was intrusted to Victor D. Brenner of New York, who is conceded to be a master of the art. There was contributed by about 500 persons a sum which after providing for the artist's fees and other expenditures left a balance of about \$4000 as a permanent fund, the interest on which is adequate for the annual purchase of the gold medal.

The general scope of the enterprise is indicated by the following proposed rules for the award of the medal:

Proposed Rules for the Award of the John Fritz Medal.

1. The John Fritz medal was established by the professional associates and friends of John Fritz of Bethlehem, Pa., U. S. A., August 21, 1902, his eightieth birthday, to perpetuate the memory of his achievements in industrial progress.

2. The medal shall be awarded for notable scientific or industrial achievement. There shall be no restriction on account of nationality or sex.

3. The medal shall be of gold and shall be accompanied by an engraved certificate, which shall recite the origin of the medal and the specific achievement for which the award is made. Such certificate shall be signed by the chairman and secretary of the Board of Award.

4. The medal may be awarded annually, but not oftener.

5. No award of the medal shall be made to any one whose eligibility to the distinction has not been under consideration by the Board of Award for at least one year.

6. Awards shall be made by a board of sixteen, appointed or chosen in equal numbers from the membership of the four national societies, the American Society of Civil Engineers, 1852; the American Institute of Mining Engineers, 1871; the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers. The governing bodies of each of these societies shall be requested to appoint from its membership one representative who shall hold office for one year, one for two years, one for three years, and one for four years; and each succeeding year to appoint one member to serve for four years.

7. In case of failure of any of the national societies to make the original appointments as requested, the selection of representatives from its members shall be made by those appointed from the other societies, and should any future vacancy occur by reason of the failure of any of the said societies to act, or otherwise, such vacancy shall be filled by the Board of Award from the membership of the society so failing.

8. Should one or more of the four national societies go out of existence its representation on the board shall cease and determine, and future awards shall be made by the representatives of the remaining societies.

John Fritz.

John Fritz, the Nestor of the American iron[®] trade, was born on August 21, 1822, in Londonderry township, Chester County, Pa., the eldest of a family consisting of three brothers and four sisters. He left his parents' farm at the age of 16 to go to work in a country machine shop at Parkesburg, later on removing to Norristown, Pa. From there he was sent to Safe Harbor, Pa., to put up the machinery of a rolling mill, under the direction of the manager, the late John Griffin. Then he became manager of the Kunsie anthracite blast furnace. After a brief stay at Norristown he went to Johnstown, Pa., in 1854 to remodel and rebuild the plant of what is now the Cambria Steel Works.

Mr. Fritz has told in his graphic manner the details of the struggles in the early days of that enterprise, where he built the first three-high mill, with the co-operation of his brother, George Fritz.

In 1860 he returned to the Lehigh region to erect a puddle mill and a rolling mill, subsequently adding a blast furnace to supply himself with metal. This was the start of the famous Bethlehem Steel Works, with the development of which Mr. Fritz was so closely identified for over a generation. He took an active part in the development of the Bessemer process in the United States and was foremost among those who designed and constructed the machinery and expanded the practice which has placed American Bessemer steel manufacture above all rivals.

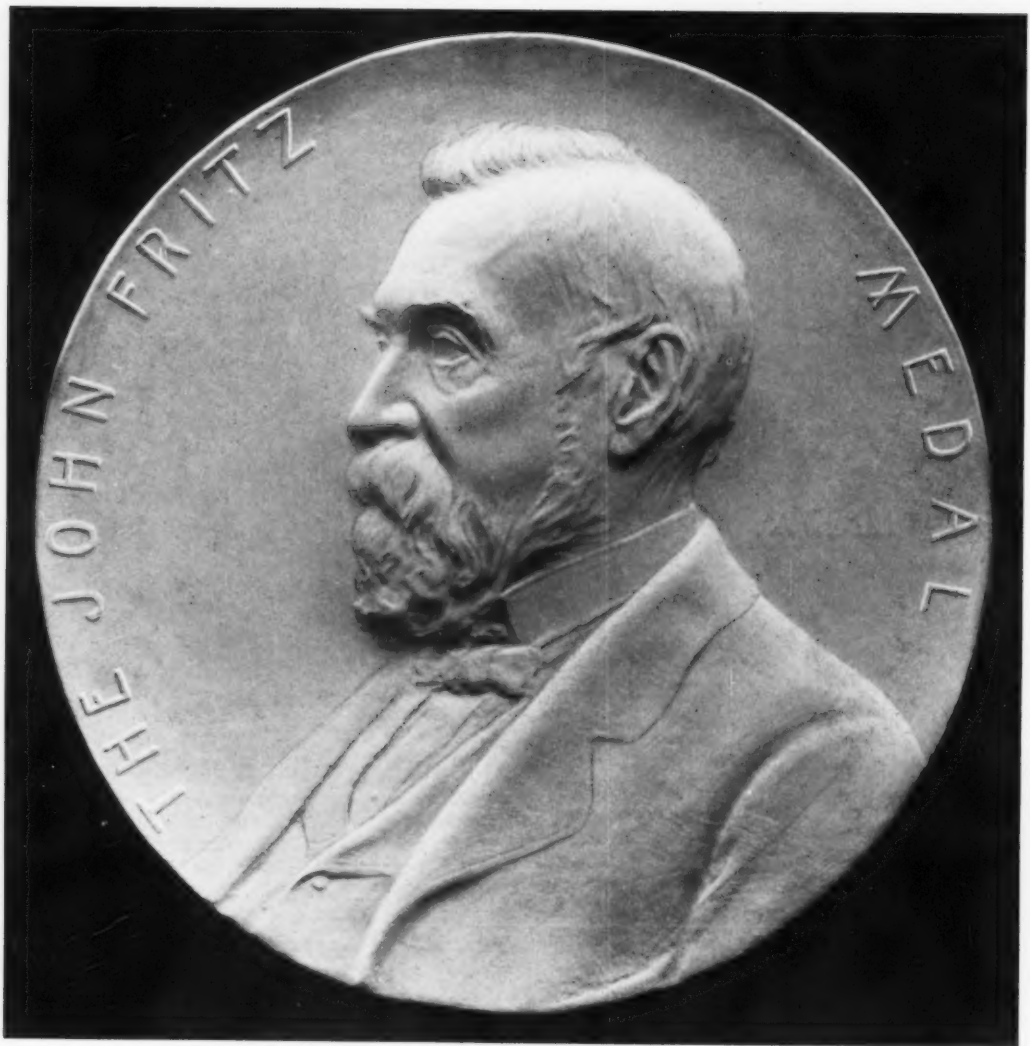
When finally the efforts to create an American navy resulted in the building of a series of battle ships and cruisers Mr. Fritz was the engineer who designed and erected the plant which has made the Bethlehem Steel Works the great forge it now is. Since he withdrew from the management of the Bethlehem Steel Works, Mr. Fritz has been actively engaged in public duties and private work, his advice being sought freely and frequently.

Mr. Fritz has been the recipient of many honors, having been elected president of the American Institute of Mining Engineers, president of the American Institute of Mechanical Engineers, an honorary member of the Franklin Institute of Philadelphia, and being the recipient of the Bessemer Gold Medal of the Iron and Steel Institute of Great Britain.

The National Acme Mfg. Company of Cleveland, Ohio, manufacturers of Acme multiple spindle automatic screw machines, Acme screw [®]stoppers, &c., have opened a sales office at 45 Oliver street, Boston, Mass., to take care of their New England business. M. M. Brunner is manager.



J. Fritz



THE JOHN FRITZ GOLD MEDAL.

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An Experience With Unions.

The Lincoln Iron Works, of which John N. Woodbine is president, and the F. R. Patch Mfg. Company, of which F. R. Patch is president, both of Rutland, Vt., have joined in the following circular to their customers:

At 8 o'clock a.m., May 30 last, a part of our machinists and helpers left our employ to enforce a demand made by the International Association of Machinists for a nine-hour day, time and a half for all overtime and recognition of the union and union principles. This was followed on August 13 by a strike of our molders for a nine-hour day, with a minimum wage of \$2.65 per day. These demands were refused, as they could not be granted and our concern continue to pay a profit. Although we are handicapped to a certain extent by freights, we have always paid a little more than the average rate of wages throughout New England. We have endeavored to treat our employees justly and fairly and we believe that the majority of those who have left our employ would testify to-day to that effect. We have always paid our bills promptly and have not missed a pay roll in more than 20 years. We believe we should be permitted to manage our own business and to employ whom we choose, and that those whom we wish to employ and who wish to work for us have the right to do so, notwithstanding the outrageous demands of the union that all workmen must join their ranks and obey their mandates or starve.

Because we have taken this stand, and are continuing to operate our plants with such faithful workmen as choose to remain with us and such others as we are from time to time able to employ, we have been subjected to damages of many kinds, the men in our employ and the officers of our companies have been subject to insults and annoyances, and even the families of our present employees have not been wholly exempt. There is ample evidence of a well defined plan on the part of the union elements in this city to either force us to yield to the demands of the International Association of Machinists and the Iron Molders' Union or to go out of business. We are obliged to send cipher telegrams to keep their contents from the strikers, and in one instance bribery was attempted to secure the contents of one of our messages from an official of the telegraph company. Workmen entering town on passenger trains are accosted by the train hands, and if coming to enter our employ the information is wired ahead to enable delegates of the strikers to meet such workmen and turn them back. Some of these workmen have been enticed to go away by bribes of greater or less amount in addition to their return passage to such points as they may select. Others who have persisted in going to work have been threatened and intimidated in every possible way, called abusive names, and in one or two cases assaulted.

Strikers and their sympathizers meet the incoming trains and circulate their handbills among the passengers. These handbills are also pasted on all machinery shipped by us from this city, in an attempt to cause trouble for us when the machinery reaches its destination. In other cases attempts have been made to persuade our customers to cancel orders or to refuse to accept machinery already delivered. Committees of striking delegates from the other unions in this city have visited hotels and boarding houses and apparently every person having a tenement to rent, and by threats and intimidations have attempted to prevent our men from getting board or a place to live, so that we have been obliged to fit up boarding houses. These boarding houses have been visited by committees of the strike sympathizers, who abused and threatened the inmates until we were obliged to surround the property with a high fence and provide police protection.

Tradesmen have been warned by the union not to sell goods to our present workmen. Barbers have been threatened if they shave them. Grocers have been threatened with boycott if they sell provisions to the boarding houses where our employees stay. Bakers have been importuned to refuse to supply bread. Workmen of other trades have been warned not to do work for us.

This boycotting and annoyance of innocent storekeepers and tradesmen is unjust, unmanly and un-American. The union thus attempts to compel business men to stand in with and fight its battle, and an organized conspiracy behind locked doors and under oath bound secrecy exists to terrorize innocent parties who cannot be forced to help the union to "hold up" our company. The community may be influenced for a time by such threats, but it cannot, of course, be permanently terrorized in that way.

Notwithstanding the unwarranted and persistent efforts which have thus been made to interfere with our business, we have filled the places of most of our striking machinists and helpers. We are still somewhat hampered in our molding department, but are able to turn out considerable work there, and see no reason why we shall not soon be running in a normal condition, notwithstanding the disadvantages under which we have been laboring. During the last few months we have, of course, not been able to fill our orders with our usual promptness. Your indulgence to us during this time we fully appreciate, and we confidently ask a continuance of your forbearance. The spirit shown by the unions both before and since the strike is one of arbitrary interference with our business, and we cannot and will not submit to the reckless and unreasonable spirit of these organizations. To do so would mean financial suicide.

The Mesta Machine Company.

In the company of George Mesta, president of the Mesta Machine Company of Pittsburgh, Pa., a representative of *The Iron Age* visited the great modern plant at West Homestead, Pa., which was fully described in these columns last year, just after its completion. Some departments of the works are even now undergoing enlargement, the pressure of work being very great. Some of the most striking of the larger engines in course of completion at the time of the visit may be noted.

On the floor was a twin piston valve reversing engine with 50 x 60 inch cylinders just completed for the Alan Wood Company of Conshohocken, Pa. The reversing links are operated by steam, and are so designed that the engine may be held in position, or that only a partial admission of steam can be arranged for when it is not necessary to exert the full power of the engine. The principle followed in designing the engine was to make the moving parts as light as is consistent with ample strength, and to make the stationary parts exceedingly heavy in order to absorb the shocks. Accordingly the piston rods are hollow forged and the pistons are of skeleton steel. The bed plates are 65 tons in weight each, and are connected with massive cross pieces. The whole weight of the engine is 775,000 pounds, all the iron castings being made of charcoal and coke iron, melted in air furnaces, and the steel castings in acid open hearth furnaces. These engines are capable of developing 12,000 horse-power at a speed of 150 revolutions.

The Mesta Machine Company are now building a pair of 55 x 66 reversing engines of a similar type for the Ensley Mill of the Tennessee Coal, Iron & Railroad Company, which, however, is even heavier, since it will weigh 875,000 pounds. It is probably the heaviest ever built. Since the Southern Railroad is unable to handle weights as great as those of the bed plates, if cast in one piece, they are cast in two pieces.

The Mesta Machine Company have now on their books a total of 20 blast furnace cross compound vertical blowing engines. Of these there are three pairs, approaching completion, for the National Steel Company and five pairs for the Union Steel Company. These engines have 44-inch high pressure and 84-inch low pressure cylinders, with 60-inch stroke. The air cylinders are 84-inch, arranged tandem to the steam cylinders. The engines are exceptionally heavy, the weight being 1,000,000 pounds, where engines of their type usually weigh 800,000 pounds. From the floor line to the top of the air cylinders they stand 48 feet high. The erecting shop of the company is so arranged that four of these engines can be erected at one time.

Among the large rolling mill work in the shop at the

time of the visit were a 24-inch Garrett mill for the Colorado Fuel & Iron Company and a 20-inch breaking down mill for the Sharon Steel Hoop Company, the 12-inch mill having just been shipped, and a horizontal blowing engine for the Joliet Steel Works, being a duplicate of an engine furnished to the South Chicago plant of the Illinois Steel Company. This engine has 44-inch high pressure and 84-inch low pressure cylinders with 66-inch stroke, the two 84-inch air cylinders being placed tandem.

Andrew Carnegie's Rectorial Address.

The rectorial address delivered at St. Andrews University, St. Andrews, Scotland, October 22, 1902, by the new rector, Andrew Carnegie, is presented in full in the *World's Work* for November. The subject is, "Europe vs. America," and is treated in Mr. Carnegie's usual forceful and original manner. Our space precludes the reproduction of the entire address, but we present some extracts from it as follows, which indicate the line of thought:

Britain alone among European nations holds in reserve an important home market capable of yielding profit equal to at least one-third or more of all her present export trade, since home commerce is doubly profitable. Here lies an untouched mine of wealth. She has in her unrivaled supply of coal, as far as Europe is concerned, another mine of vast wealth.

There is one dark cloud upon her horizon which cannot be ignored. From the best information I can obtain, in 20 or 25 years the supply of Cleveland ironstone will be practically exhausted at the present rate of production, except that two concerns will then still have sufficient for some years longer. The Cumberland supply is already nearly exhausted. This will bring dearer iron and steel. Without cheap iron and steel the construction of ships and machinery of all kinds, and of the thousand and one articles of which steel is the base, would tend to decrease; but the loss in this trade may be compensated for by increase in other branches, caused by the ever growing wants of the world. Britain is not alone concerned in the ironstone supply, for, as far as I know, the supply is soon to become precarious in some of the other manufacturing nations before many decades pass unless new sources of supply are discovered. Even the United States has a proved supply of first-class ore only for 60 to 70 years, and a reserve of inferior grades which may keep her supplied for 30 years longer, say for a century in all, unless the rate of consumption be greatly increased. The enormous extent of territory in the Republic over which ore can hopefully be looked for encourages the belief that new deposits are sure to be found. It is upon new discoveries that Britain depends, the outlook in her case being less hopeful. Germany has to-day, as far as proved, the most enduring supply, although its ore is not nearly so rich as the American.

We hear of huge industrial combinations on land and sea, but the combination of 45 States, some of them larger than the United Kingdom, forming the American Union, which promises soon to equal Europe in the production of many of the staple articles, and is already producing more than the rest of the world of the article of prime importance, is a portent of infinitely more consequence to the world than any possible industrial combinations, the latter being trifling in comparison. At the present rate of progress America will, in the lifetime of many present, have a population equal to that of Europe to-day, excluding Russia.

Since his continent has less than 30 people per square mile, the American has a constantly expanding home demand urging him to extensions and justifying costly improvements and the adoption of new processes. He has also a continent under one government. He establishes his several works at the centers of the various markets. If a needed ingredient be found in one State, another somewhere else, if it be desirable to construct works for one part of a process here, or there, or ply ships, or build railroads in any part of this broad area, he proceeds without hesitation, dreading neither interference with supplies, hostile legislation, nor national antipathies. "No pent up Utica contracts his powers." More, the boundless continent is his, as are all its mar-

kets, free from tariff. His operations are free from start to finish.

The result is that every process of manufacture in the Union flows naturally to the localities best adapted for it, there being no barriers to free selection. The best places also are selected for assembling materials, raw or partially prepared, for their final forms. In short, there is free, unrestricted trade in everything under the same conditions, same laws, same flag, and free markets everywhere over an expanding continent—advantages which only those experienced in industrial trade will estimate at their full value.

The European manufacturer finds obstacles to such varied expansion in a continent divided into hostile and warring States, with different laws and exactions and tariffs at every boundary, the fear of war overhanging all. He is almost compelled to confine his investments and works to the small area of his own country and its small home market.

One of many telling advantages which industrialism receives from political union in America is that a great home demand for any article from one united people occupying a continent evolves standard forms, the evolution of the best types, which justifies the manufacturer in erecting special machinery and running it exclusively upon each part of the type. Railway, electric, harbor, bridge—engineers in these and other branches adopt the standard forms; hence whenever a huge bridge, for instance, is needed promptly in any part of the world—Egypt or India—America is applied to. The steel maker has his bridge construction and bridge erection departments managed by specialists who know what is best much better than any general engineer possibly can. The proper plans for the standard bridge required are taken and the work begins instantly. Note here that the steel maker is also the bridge contractor—a vital point. The bridge is probably open for traffic before the European engineer could have submitted plans and the bridge maker had contracted with the steel maker. A new bridge in Europe is a new creation in which several separate contractors have participated. In America it is from standard patterns evolved from experience and completed from start to finish by one contractor.

In greater or less degree this exists in the manufacture of the principal articles of which America is now the greatest producer. Consider agricultural machinery. One of the leading English manufacturers once told me that he had been compelled to abandon foreign markets and finally to cease business. The American manufacturer had triumphed. While here three or four hundred machines were sufficient for the season's demand, his friend in America put in hand 7000. Megalomania again. This output justified the automatic machinery used in every process of manufacture. If my memory be correct, it was 22 men in Britain for two men in America in one of these processes—that is, the machinery did 20 men's work. Why, then, not adopt it in Britain, you say. Small home demand is the adequate reply, and that demand itself open to the American competitor.

Here is an illustration of different character. The Republic has now more than 10,000 miles of connected river and lake navigation which supplies the cheapest inland transportation of materials in the world. Having one government, these lakes and rivers were easily improved and joined, harbors deepened, and rivers rendered navigable by means of movable dams and locks. The work still goes steadily on under Government naval and military engineers. Some years £12,000,000 have been devoted to it. In one day recently 226 barges, containing 200,000 tons of coal, passed through the Ohio River lock at Pittsburgh for Western and Southern cities. All articles can be thus floated or towed to points 3000 and even 4000 miles distant for a few shillings per ton.

The ironstone from Lake Superior mines is transported over part of this water system to the coal of Pennsylvania for 900 miles at a cost of 2 shillings per ton—one of several elements in the making of cheap steel. So much for water transportation through the action of Government. Now consider land transportation by railroad through private agency. There is free trade in railroad building. Five men in Pennsylvania, for instance, can meet and organize a company under the general railroad law by satisfying the county court that

it is a *bona fide* enterprise, and that the capital is subscribed and one-tenth paid in; a charter issues costing 8 shillings and the work begins. Railway traffic rates per mile do not average over one-half, sometimes one-third, those of Europe for long distances. Often for 3000 miles merchandise is carried by rail in bulk, without transfer, at rates that would surprise you.

Let us go to Germany for another proof that magnitude tells. She is supreme in speed upon the Atlantic; no steamships like hers. And why? Because these monster ships start from Germany after draining the passenger travel of Northern and Eastern Europe. Not content with this, they touch at Southampton and compete for British travel, and still unsatisfied cross to Cherbourg and drain France and Southern Europe. On their homeward trips from New York they are filled with passengers for all these ports. It is not subsidies which enable the Germans to conquer here, for their lines are not paid more than half what British lines on the Atlantic receive. It is magnitude. The 250,000,000 people the German lines serve is equivalent to a great home demand. This justifies their ocean greyhounds as the American market justifies unequalled manufacturing establishments. Since these lines were penned strong proof has come of the law of surplus. The Britain, the smaller market, has been compelled to pay \$150,000 per year for two Atlantic greyhounds, while the greater market, Germany, has four of these supported by the greater demand of the greater market.

Germany, in herself, furnishes proof of the necessity in this age for consolidation of small areas. As long as she was cut up into petty divisions, with different laws and tariffs, she had no international position industrially—it was impossible she could have. United into one empire, with free trade over the whole area, giving a home market of 56,000,000 people, she only needed to encourage the development of her resources, which was wise statesmanship, to become the dangerous rival of Britain, and even to outstrip her in the most important article of all—steel.

One more illustration. Switzerland was the land of watch manufacture by hand. America introduced machinery, having an enormous home demand, there being scarcely an American adult without a watch. Now one concern there make more watches than all of Switzerland, as one American constructor makes more locomotives than any European country, and one agricultural implement maker makes more machines than all Britain.

Another proof of the value of home demand can be given from Britain. One important department in Europe is unequalled by the American—shipbuilding, which also obeys the law of great home demand. Since Britain has been the great exporter and importer of the world and the greatest naval power, naturally the building of ships has taken firm root there, and in the world's market she remains supreme. Having the enormous home demand, she conquers the foreign.

More and more clearly must the truth be realized that the industrial struggle among the nations is bound up with the political, the question of magnitude being at the bottom of supremacy in both. A nation cannot be small in size and in population and remain great in material products or material power. To maintain first rank industrially, commercially or financially small nations must merge with others and become prosperous parts of one great federated power. Once the race was between separate nations; henceforth it is between continents.

Ask yourself this question: If America had been composed of petty, independent, jealous States, as Europe is, each afraid of the other, and armed to the teeth against expected attacks, and had erected tariff barriers against the products of each other, would Europe ever have heard of the American industrial invasion? To ask the question is to answer it—never.

The deepest and most powerful of all contrasts between the two is that the one continent is one harmonious, peaceful, co-operative whole, its power and energy directed to industrial progress; the other divided into hostile camps—the power and energy of each directed to military protection and commercial isolation.

Ask yourselves another question: Can Europe, as long as she remains divided into hostile camps, ever hope to conquer foreign markets or even to repel the American invasion? That question also answers itself—never.

World's Production of Petroleum.

Much interest attaches at the present time to the statistics of the production of petroleum given in the report on the "Mineral Resources of the United States for 1901," just issued by the United States Geological Survey. The following table, taken from the report, gives the production of all of the known countries that produce crude petroleum, together with the percentages of each for 1900 and 1901, in United States barrels of 42 gallons, approximately:

Country.	1900.	Per cent. of total.	1901.	Per cent. of total.
United States.....	63,620,529	42.95	69,389,194	41.95
Canada	692,650	.47	704,872	.42
Peru	102,976	.07	72,261	.04
Russia	75,779,417	51.16	85,168,556	51.50
Galicia	2,346,505	1.58	3,251,544	1.97
Sumatra, Java and Borneo	1,967,700	1.33	3,038,700	1.84
Roumania	1,628,535	1.10	1,406,160	.85
India	1,078,264	.73	1,430,716	.86
Japan	528,000	.36	600,000	.36
Germany	358,297	.24	313,630	.19
Italy	12,102	.01	10,100	.01
Totals.....	148,114,975	100.00	165,385,733	100.00

This table shows that, while petroleum is produced in a number of countries, the great sources of the world's supply are Russia and the United States. Up to 1898 the United States led the world in the quantity annually produced, but in that year Russia forged to the front, and has since not only maintained its position, but has increased its lead. Beginning with 1896, the Russian production has been increasing by an average of over 12 per cent. each year to the close of 1901. In round numbers the figures of production for the two countries for the past five years are as follows in barrels:

	1897.	1898.	1899.	1900.	1901.
Russia.....	54,000,000	62,000,000	66,000,000	76,000,000	85,000,000
United States.....	60,000,000	55,000,000	57,000,000	64,000,000	69,000,000

The average annual increase during the five years for Russia has been 12.57 per cent.; for the United States, 2.89 per cent.—there having been a small decrease in the production of the United States in 1897, and a large decrease in 1898.

The facilities for handling the large Russian production are at present crude, costly and wasteful. The markets are far away from the production. The main foreign shipping port at Batoum, on the Black Sea, is separated by mountain chains from the chief center of production, Baku, on the Caspian Sea. To bring the oil to the seaboard 400 miles of railroad must be traveled to the terminus of the pipe line, and then 160 miles still remain before reaching Batoum. The capacity of the pipe line is almost double the capacity of the railroad, so that the amount taken to Batoum depends upon the capacity of the railroad. The Volga River is an outlet for 80 per cent. of the production, and reaches many miles into the heart of the Russian Empire. But the Volga is frozen up for several months in the year, and is subject to months of low water stages in the summer and fall. The price of 10 kopecks per pood, equal to 46 cents per barrel, for residuals or fuel oil, allowing 3.5 barrels to equal 1 ton of Russian coal, places a value upon the oil corresponding to \$1.61 per ton for coal. When the oil is valued at 11 kopecks per pood, or 51 cents per barrel, the price is equivalent to \$1.78 per ton for coal. This is a very fair price for the petroleum and should carry it a long distance before the cost equals the corresponding cost of the Russian coal, which is high priced and inferior in quality.

The irregular supply and the fluctuating price interfere with the sale of larger quantities of fuel oil in the great interior of Russia. At the price of 10 kopecks per pood, or 46 cents per barrel, which is considerably higher than the average price for 1901, the oil could not fail to secure a market if transportation could be guar-

anted, and at prices much in advance of the price named for comparison.

During 1900 Russia produced only about 17,500,000 short tons of coal, the higher grades of which sell for 14 to 16 rubles per ton, or about \$7 to \$8 per ton. During the same year the United States produced, in round numbers, 270,000,000 short tons of coal. All of the countries bordering on the Mediterranean Sea are poorly supplied with fuel. When it is considered that two-thirds of the total production at Baku (about 81,000,000 barrels in 1901) now finds a market as fuel oil, this becomes an equivalent of nearly 16,000,000 tons of coal.

When certain means of oil transportation now in contemplation in Russia—namely, pipe lines to Batoum and to Moscow—are finished the value of this liquid fuel will begin to be appreciated, and the internal industry of that great country will receive the benefits to which it is entitled from nature's bounty.

The total exports of petroleum, crude and refined, from Russia to foreign ports in 1901 were 428,657,210 gallons, or 40.33 per cent. of the total exports of petroleum from the United States in the same year, which amounted to 1,062,750,306 gallons.

The very great difference between the petroleum of the United States and that of Russia is shown in the statistics of refined petroleum. Of the total world's production of crude petroleum in 1901, 165,385,733 barrels, the United States produced 69,389,194 barrels, or 41.95 per cent., and Russia produced 85,168,556 barrels, or 51.50 per cent.; and yet of the total production of refined petroleum of all grades in 1901, estimated at 1,500,000,000 gallons for all countries, the United States produced 911,120,944 gallons, or 60.7 per cent., and Russia 414,122,990 gallons, or only 27.7 per cent.

The Michigan Water Power Canal.

The opening of the new water power canal on the Michigan side of the St. Mary's River marks the completion of an engineering work of great magnitude, which has been in progress for four years and which has been accomplished at a cost of about \$4,000,000. This is the second water power canal constructed by the subsidiary companies of the Consolidated Lake Superior Company, the first canal being one of about 20,000 horse-power on the Canadian side of the St. Mary's River, which has been in operation for about seven years. Both of these canals utilize the outflow from Lake Superior into Lake Huron, the difference in levels between the two lakes at the rapids of the St. Mary's River being about 20 feet. Lake Superior is the largest body of fresh water in the world, covering an area of about 30,000 square miles, and the discharge of water into Lake Huron through the St. Mary's River varies from 3,500,000 to 7,000,000 cubic feet per minute, according to the season of the year and the direction of the wind. It is calculated that if the entire flow of water from Lake Superior could be utilized for power purposes it would develop an aggregate of from 130,000 to 360,000 horse-power. The new canal, which has just been completed, will develop about 60,000, while the old canal on the Canadian side yields about 20,000 horse-power. These two canals, therefore, together develop about one-half the minimum aggregate power that is available.

The Michigan canal, the formal opening of which on October 25 celebrated the fourth anniversary of the signing of the contract for its construction, has a total length of 2 1-3 miles. Its inlet is near the entrance of the American ship canal above the town of Sault Ste. Marie, and the route of the canal is through the heart of the town, running parallel with the St. Mary's River most of the distance and then turning at a right angle to discharge through the power house on the bank of the river.

At its entrance the canal is about 950 feet in width, narrowing in a distance of 2900 feet to a width of 220 feet, where the head gates controlling the flow of water are placed. These head gates consist of four steel shutters 48 feet wide and 26 feet high operating between heavy masonry piers. From the inlet to this point the canal was cut through solid rock to a depth of 22 feet, and from this point the cut continues in rock of the same

depth cut 200 feet in width for a distance of 2700 feet. The remaining portion of the canal was excavated in earth, and the same width and depth are maintained to the end, although the cross section of the canal varies from the vertical sides in the rock cut to a slope of 45 degrees and then to an elliptical section. All that portion of the canal excavated in earth is lined with heavy timbers to preserve its shape and to reduce the friction of the flowing water.

As the canal approaches the power house it widens gradually into a fore bay 1400 feet in width, across the end of which the power house is constructed as a dam to intercept the flowing water which there passes through the turbine wheels. The power house is 1368 feet in length and 100 feet wide. As a foundation 1200 50-foot piles were driven to bed rock, and were covered with a bed of concrete 3 feet in thickness. Across this foundation were constructed 82 walls of molded concrete blocks 100 feet long, 20 feet high and 3 feet in thickness, thus making 81 discharge pits 15 feet wide, 100 feet long and 20 feet high, with arched concrete floors and roofs. Above these pits were constructed an equal number of similar chambers 15 feet wide, 20 feet high and 48 feet in length, in which are placed the turbine wheels, the water flowing through these wheels and passing out through the discharge pits into the St. Mary's River. The inner ends of these upper chambers are closed by curved steel bulkheads through which the shafts of the turbines pass and are connected directly with the dynamos on the main floor of the power house.

The middle chamber in the power house is left open for the passage of ice, logs or any similar matter which might obstruct the operation of the wheels, and in the remaining chambers there are to be placed 320 33-inch turbines; four turbines in each chamber running upon a single shaft with a discharge pipe or draft tube for each pair. Above the floor on which the dynamos are placed are two additional stories available for manufacturing purposes using the power generated below. The power house is built entirely of stone, concrete and steel, and is an unusual example of substantial mill construction, in which a great deal of attention has been given to architectural effect. The total height of the power house from its foundation is 105 feet.

The discharge of water through the turbines will be about 1,800,000 cubic feet per minute, which will develop about 60,000 horse-power.

In the construction of the canal and power house 1,250,000 cubic yards of rock and 3,000,000 cubic yards of earth were excavated 3,500,000 feet of piling were used, 900,000 cubic yards of masonry constructed and 170,000 cubic yards of concrete.

An interesting adjunct of the canal is the compensating works which were required by the Government in order to prevent the lowering of the level of Lake Superior and interference with navigation by the diversion of so much water through the power canal. These compensating works consist of a breakwater about 1000 feet long extending out from the Canadian shore just above the head of the rapids. At the end of this breakwater four steel gates have been constructed 48 feet long and 15 feet high, operated between masonry piers with a superstructure of steel, and beyond these gates a submerged dam will be carried for a distance of about 500 feet. The purpose of these gates, breakwater and dam is to shut off a flow of water from the rapids equivalent to the amount which passes through the new power canal, so that the total discharge into the St. Mary's River shall remain unchanged by reason of the new power canal that has been constructed, and which will require so large a volume of water.

Since the beginning of the construction of the water power canal four years ago there has been an increase of nearly 2 feet in the difference between the levels of the St. Mary's River and Lake Superior, due chiefly to the widening of the channel of the St. Mary's River below the rapids in order to accommodate the increasing volume of steamship traffic.

The power generated by this great plant will be distributed electrically to manufacturing establishments located in the vicinity and contracts that have already been made will absorb a large portion of the entire output of power.

The Iron Age

New York, Thursday, October 30, 1902.

DAVID WILLIAMS COMPANY,	-	-	-	-	-	-	PUBLISHERS.
CHARLES KIRCHHOFF,	-	-	-	-	-	-	EDITOR.
GEO. W. COPE,	-	-	-	-	-	-	ASSOCIATE EDITOR.
RICHARD R. WILLIAMS,	-	-	-	-	-	-	HARDWARE EDITOR.
JOHN B. KING,	-	-	-	-	-	-	BUSINESS MANAGER.

Tariff Revision Approaching.

Public sentiment is working rapidly in the direction of a revision of the tariff. We have been free from any agitation of this question for several years, and it had been hoped by all manufacturing interests when the Dingley tariff bill became law that everybody concerned would be willing to let the matter rest for ten years at least. The adjustment of duties then made was not regarded as completely satisfactory. It was not acceptable to a very considerable part of the people. Some of the rates made were too high to suit the views of consumers and some were too low to meet the approbation of manufacturers. But, having been enacted after much discussion and with considerable disturbance to business, it was but natural that the great majority of business men should hope for a long rest from a similar interruption. It seems, however, that the tariff question is one which will only be settled with any degree of permanency when this country gets into the position of Great Britain and adopts free trade by such an overwhelming majority that the advocates of tariff protection will feel too feeble to agitate for a revision according to their ideas.

The agitation for a revision of the tariff is due to a variety of influences, but the most potential is the belief many have that by removing duties on articles produced by trusts their operations will be hampered and commercial conditions will be improved. This we believe to be a mistaken view and not likely to work out in the way in which its advocates expect it to operate. But they are very much in earnest and may win sufficient support to their theories to exert much weight in any revision of the tariff undertaken in the near future. Arguments are of little avail when great masses of the people become imbued with the belief that they are suffering and must have immediate relief. They are not willing to be patient and wait for the inevitable growth of competition which has always undermined any combination of manufacturers endeavoring to build up a monopoly.

The effort to head off tariff tinkering by the negotiation of reciprocity treaties has been a failure. They were wise beyond their generation who sought to use the drastic duties of the Dingley act for the purpose of winning further trade concessions from nations who are, or ought to be, good customers of ours. If important treaties of this character had been in operation for the past two years it is likely that their benefits would have been so apparent by this time that much stronger support would have been won in favor of retaining the tariff fabric thus built up. But no manufacturing interests were willing to abate a jot or tittle of the protection given them by the Dingley Act and they have thus contributed toward the danger of a much greater reduction in duties under a general revision of the tariff.

A strong effort is being made to build up a sentiment in favor of the establishment of a tariff commission, to be charged with the duty of revising duties whenever

such revision seems desirable. Efforts in this direction are simply time and energy wasted. Experience with the tariff commission of 1880 showed conclusively that Congress will create such a body, but that it cannot be induced to permit the commission to frame a measure which shall become law in the shape in which it is reported. An ideal condition would be brought about if such a piece of work could be accomplished. But Congress will not abdicate its functions to any outside body in framing tariff enactments. It might as well be expected to hand over the framing of patent laws to a commission of patent experts, navigation laws to a commission of vessel owners, and banking laws to a commission of bankers. All these might be better done than by the 'prentice hand of Congress, but Congress will not intrust a piece of work of this character to other hands. The representatives elected by the people are not disposed to shirk their duties.

Although our frequent overhauling of the tariff is disquieting and unsettling to business interests, it is fortunate for the country that the same influences are not operative here which are felt upon such occasions in Germany. That country is now passing through the throes of a tariff reconstruction in which the agrarian interests are bitterly hostile to the industrial interests. It is asserted that the agrarians are more than willing to see the industrial interests suffer from outside competition which would restrict their business, because with diminished employment in factories labor would seek work in agriculture and wages of farm hands would be lowered. Here we do not as yet have any considerable number of our people anxious to wreck our industries that they may derive doubtful profit. No American of sound mind desires to close any home factories, even though he may be furiously seeking some method of securing lower prices on commodities he is compelled to purchase.

Some Phases of Illinois Labor Unions.

Chicago representatives of organized labor are trying to make capital out of a circular issued by D. M. Parry, president of the National Association of Manufacturers, in which the attention of members of the association is called to pending legislation at Washington, which is regarded as hostile to the interests of the manufacturing industries of the United States.

These labor agitators, unfortunately, not content with striking fear into the minds of workingmen, thereby increasing their own security, are making another effort to arouse public sentiment against capital and to create sympathy for the cause of organized labor. In this attempt the newsgathering sense of the ubiquitous reporter has been imposed upon, the circular being presented to the public under the flaming and misleading headlines: "Big War Begins on Union Labor." It has been insinuated that the contents of the circular, until last Saturday, were shrouded in mystery, and that the labor societies were forced to base their protests on rumor and conjecture.

The facts are that the circular of President Parry, after announcing a significant growth in the membership of the National Manufacturers' Association, merely echoes the sentiment of the members in annual convention assembled last April, when strong resolutions were passed upon the proposed eight-hour law and upon the anti-conspiracy bill among other measures of importance. Not only was no attempt made to conceal the sentiment of the convention, but reports in detail were published and widely circulated. No one in interest can affect with propriety to be in ignorance of the attitude of

manufacturers toward the Congressional bills referred to.

While President Parry's circular has no uncertain sound, it must be regarded as defensive rather than offensive, the initiative having been taken by the labor organizations through whose instrumentality the bills, regarded by the manufacturers as inimical to their interests, were introduced.

Chicago delegates to the New Orleans convention of the American Federation of Labor propose to have the burden of President Parry's circular acted upon by the labor organization, and there can be little doubt what the outcome will be at New Orleans, but misrepresentation must tend to alienate public sympathy.

It was but ten days ago that the Illinois State Federation of Labor passed resolutions hostile to the maintenance of the National Guard. This is a most sinister development and indicates how potent has become alien sentiment and influence—for it is un-American—in the government of labor organizations. A few more such fatal steps would wreck the hopes of trade unions irretrievably. The sentiments which lie concealed under such acts if allowed to grow would undermine all government; they are the product of a warped mind, which confounds liberty with license. The American people are intensely patriotic and will suffer no such weeds to grow on American soil.

The resolution which was passed at East St. Louis charging that when the militia is called upon to suppress disorder and lawlessness it is, in effect, called upon to shoot workingmen is a monument to the disgrace if not to the lack of intelligence of a misguided organization. The assumption that the National Guard is organized solely in the interest of capitalists is untenable; without foundation in fact. The militia is never used to coerce law abiding people, and when it is contended that the National Guard in protecting life and property or suppressing riot—often the outcome of strikes—is operating against workingmen it is tantamount to stating that workingmen are outlaws and criminals, which they assuredly are not. It is the lawless element, organized or unorganized, which interferes with the rights of others, that must be controlled, or suppressed by force, if necessary.

Some years ago the same unwholesome advice was given by irresponsible leaders to members of labor unions, but the recommendation was withdrawn subsequently, and it is to be hoped that the recent resolutions passed by the Illinois State Federation of Labor charging union workmen not to join the militia, and recommending union enlisted men to withdraw, will be rescinded. Loyal and patriotic citizens cannot afford to allow themselves to be placed in such an embarrassing, if not compromising, position.

The Development of Steam Turbines.

Recent achievements of the steam turbine have strengthened the belief of eminent engineers that we are on the eve of a revolution in the application of steam as a motive power. Already the steam turbine has proved itself a formidable rival of the reciprocating steam engine for driving electrical machinery. From the performances of the turbine it would seem that the electrical field is pre-eminently its province owing to the high rotative speed attained. But as a marine engine the turbine has proved itself both economical and efficient, its success on board ship being but little inferior to its performances in generating the electrical current. The difficulties encountered in maneuvering a vessel, especially in stopping, have led to the opinion that the field of the turbine would necessarily be confined with-

in narrow limits, and that it could never meet successfully the competition of the reciprocating steam engine in commercial practice where relatively slow speed is required, and especially could it never compete in the railroad field, the peculiar requirements of the locomotive being most severe.

These opinions are necessarily based upon experience with the forms of turbines now in practical operation, but it would be hazardous to predict that the future application of the turbine will be confined to either the electrical or marine fields. Mechanical ingenuity may accomplish many wonders with the steam turbine as it has done in refining the reciprocating engine.

As is well known the steam turbine is the simplest form of motor known, carrying us back to the beginning of dynamics when Hero of Alexandria first introduced his æolipile. The forms of steam turbines the performances of which are now calling forth the praise of the engineering world are little more than the spirit of the æolipile moving the wheel Branca plus the mechanical features which are the product of the ingenuity of the present age. All these forms of turbines derive their motive force through the impact and reaction of steam, the expansive force resident in the steam coming into service only in a minor capacity, and many of the vanes or blades upon which the steam impinges are stationary in most types, accounting for a considerable loss of energy which might be saved if it were possible to so construct the turbine as to have all blades in motion.

By the most conservative class of mechanical engineers the steam turbine is still regarded as in an experimental stage; but as a rule it is being received with favor, and, while it is acknowledged that the tests made show a high degree of economy fully up to if not beyond the standard of the compound condensing engine, it is pointed out that few installations have been in operation a sufficient length of time to demonstrate the difficulties which may be encountered through extended service.

Figures presented at the recent meeting of the British Association, however, indicate that the turbine is being generously adopted as an electrical motor as well as a marine engine. Its first use as a turbo-generator was in 1884, and by 1890 360 plants, ranging from 4 to 120 horse-power and aggregating more than 5000 horse-power, had been installed. From the same source it is learned that there are now in use and building turbines aggregating over 300,000 horse-power, the largest turbine installed being of 3000 horse-power. The difficulties in designing large turbines, however, seem to have been overcome, and turbines up to 5000 horse-power are now building in this country, while two 4000 horse-power turbine engines have been ordered for steamers to ply in the channel service.

The latest and by far the most interesting information concerning turbines comes from Chicago, where a new type of steam turbine has been made and tested, and where a wheel designed to generate 2500 horse-power is being manufactured. This new turbine utilizes the expansion of steam and is possessed of revolutionary features. The claims made for it are bold. Its mechanical construction is highly ingenious and designed to overcome the difficulties which have heretofore narrowed the field of application of steam turbines, it being possible even, it is said, to utilize this type of turbine in locomotive practice; and if anticipations are realized it is plain to see that we have truly reached a new era in the history of steam application. Tests which have been made with a 90 horse-power turbine of this type are said to have encouraged the belief that we are

about to witness the performances of a motor of the highest efficiency and greatest economy, but only the future can determine how well such faith is founded.

Worcester Manufacturing News.

WORCESTER, MASS., October 27, 1902.—The Graton & Knight Mfg. Company, manufacturers of leather belting of all descriptions, are building a large storage warehouse on their premises on Bloomingdale Road. The building will be of brick, 60 x 90 feet, and four stories high, of heavy mill construction. The business of the company has been greatly increased during the past year or two, so that the big factory erected only a few years ago is needed for manufacturing purposes entirely, and consequently new storage became an imperative necessity. The new building will make possible considerable additional room for other departments and will also add greatly to the storage capacity. This company are now employing more than 1100 hands.

The Reed & Prince Mfg. Company, manufacturers of wood screws, bolts, rivets, &c., have decided to rush the work of building a new plant through the winter months, instead of waiting until spring as had been previously planned. The foundations are already in, and are of the most substantial character. The company will build larger than was given out in the first announcement of the new plant. Instead of 100,000 square feet of floor space there will be nearly 120,000. The building will be of brick and four stories in height. There will be no basement, as in times of freshet water is apt to flow back and might flood a basement story. The main building will be 54 x 252 feet, and there will be three ells, respectively 54 x 154, 54 x 96 and 46 x 54 feet. The buildings will be 50 feet high. Particular attention has been paid by the architects to secure the maximum of light and the ventilating and other sanitary features will be of the latest type. The Reed & Prince Company have secured an additional piece of land which gives them about 4 acres. It is expected that the company will be in their new quarters and running full by June 1, but not before, as there will be delays in building in the New England winter, and the process of moving the big business will be a tedious one. The contract for the building has been let to a Worcester firm.

The contract for the new library building for Brown University at Providence, R. I., has been let to Norcross Bros.' Company of Worcester, the contract price being in the neighborhood of \$130,000.

Norcross Bros.' Company were one of the bidders on the contract for the new dry dock to be built by the United States Government at the Norfolk Navy Yard. No contract has been awarded, however, it having been decided to call for new bids. In the original advertisement for bids two sizes of dry dock were specified, it not having been decided which would be built. Norcross Bros. were lowest in the bidding for the smaller size of dock by \$10,000, and were \$3000 above the lowest bidder for the larger size. As the price would be more than \$1,000,000 the bidding was exceedingly close. It is not given out here why new bids are asked for.

O. W. Norcross, president and treasurer of the Norcross Bros.' Company, makes formal denial of a report that his company have been absorbed by the new American Realty Company. Mr. Norcross states that there have never been negotiations of any sort to that end.

The George H. Cutting Company of Worcester have been awarded the contract for the granite work for Charles M. Schwab's new residence in New York. The contract price is in the neighborhood of \$400,000.

The contract for the new plant of the Standard Plunger Elevator Company, at Jamesville, has been awarded to George H. Cutting & Co. of Worcester, the contract price being \$41,000. The work has already begun with an unusual number of men employed in the construction, to insure the early starting of manufacturing.

The Washburn & Moen Department of the American Steel & Wire Company have offered their employees a high quality of bituminous coal at \$4.90 a ton, delivered at their homes. Up to date the men have ordered

some 1500 tons, each man taking a ton. As soft coal is selling at \$8 a ton and hard coal at \$12 a ton in Worcester the Washburn & Moen men are well contented with their lot so far as coal supply goes. The Washburn & Moen officials made careful tests in kitchen ranges before offering the coal. They found that it burned excellently.

The steel plant and blooming mill of the Washburn & Moen department have been shut down for a fortnight and were started up again to-day. The reason was the breaking down of the blooming mill engine. Repairs were not hurried, however, as the opportunity was taken to take account of stock in this and other departments.

The Harrington & Richardson Arms Company are also supplying their employees with bituminous coal at a price less than that asked by the local dealers.

Oliver M. Dean of Worcester, broom manufacturer, received a circular letter last week from W. A. Shepard of the Onondaga Whisk Broom Works of Syracuse, N. Y., who is the prime mover in the attempt to consolidate the broom manufacturing business of the United States. The letter states that New York capitalists have agreed to finance the consolidation, providing that the various companies can be brought together on a reasonable financial basis. The proposition is to capitalize a corporation for \$5,000,000, the various companies which would be absorbed representing a present investment of about \$3,000,000. According to this letter Mr. Dean says the companies which would be taken in, if the consolidation can be effected, are the American Broom Company, Amsterdam Broom Company, Pioneer Broom Company and Gardner Broom Company, all of Amsterdam, N. Y.; Mohawk Valley Broom Company of Fonda, N. Y.; Onondaga Broom Company and Syracuse Broom Company of Syracuse, N. Y.; Southwestern Broom Company of Evansville, Ind.; Merkle Wiley of Paris, Ill.; Donaldson & Beale of Sydney, Ohio; White-Valentine Company and Urbana Broom Company of Urbana, Ohio, and the A. Boyer Broom Company of Galesburg, Ill. It is not understood that any of the companies have yet given options. Mr. Shepard's circular indicating that the financial backing of the scheme having been looked after, the manufacturers may now decide what course they will take in the matter.

According to the talk in elevator circles, the establishment of the new Standard Plunger Elevator Company will mean the retention of the Plunger Elevator Company, a department of the Otis Elevator Company at Barbers Crossing. According to this talk, which seems to come from most reliable sources, it had been planned by the Otis Elevator Company to abandon this branch of the business, at any rate to abandon the Worcester connection. The officials of the Plunger Elevator Company are reticent in the matter.

Omega Steel.—The National Tool Company, New Haven, Conn., are manufacturing a new brand of tool steel which they have named Omega steel. It passes through a secret process, after which a tool made from it is claimed to cut cast iron or steel at a higher rate of speed than tools made of steel in general use. A remarkable test is reported by the company as follows: "We found a machinist turning wood at very fast speed. We replaced this with a hard piece of cast iron and kept the same speed with a 3-16-inch cut, and our tool went right through with it without harm." They claim to cut at the rate of 72 feet per minute in extra heavy cuts. They are prepared to furnish the same steel soft, so that it can be made into twist drills, reamers, &c. After completing such tools they are merely heated to a cherry red and cooled in an air blast, after which the company state they will not crack or warp.

Stockholders of the Consolidated Lake Superior Company in annual meeting at New Haven, Conn., October 27, chose these directors: Edward J. Berwind and Charles E. Orvis, New York; F. H. Clergue, Sault Ste. Marie, Ont.; Lynde Harrison, New Haven, and H. A. Berwind, E. V. Douglass, W. I. Douglass, Samuel Rea, Edward C. Lee, F. S. Lewis, George Philler, S. M. Prevost, T. C. Search and James S. Swartz, all of Philadelphia.

Chaos Among German Syndicates.

The Pending Tariff Bill.

BERLIN, October 12, 1902.—Germany's iron and steel trade is most vitally concerned in the fate of the tariff bill pending before the Reichstag, although popular clamor directs attention chiefly upon the grain and raw food clauses demanded by the agrarians. Chaos prevails among the individual members of the giant iron and steel syndicates, some of whom urge a free trade policy such as Great Britain pursues, and others demand an ultra protective tariff copied after the Dingley law. The latter point out that Germany is placed at a disadvantage because the existing tariff, for example, on raw iron is only 1 mark per double centner weight (200 pounds), while the United States applies a protective tariff equivalent to 1.68 marks, Austria-Hungary 1.32 and France 1.20. The free traders, again, base their argument upon the success of their principles as illustrated by British exports and the tremendous upward movement of German iron and steel exports after the enactment of the Caprivi reciprocity treaty of 1893, which affected the German iron and steel trade with Austria-Hungary, Sweden, Russia and Switzerland. Between these two extremes there are innumerable factions demanding a more or less high or moderate tariff for iron and steel products.

The Government tariff bill provides no change in the protective tariff of 1 mark on raw iron imports, but increases the tariff on bar iron, chain and cast iron to 3 marks, with variations according to quality; on tools increases the tariff from 2.50 marks to 8 marks; on steel billets from 1.50 marks to 4 marks; on tin plate and sheet metal from 3 marks to 3, 4.50 and 5 marks; on drawn wire, a scaling tariff from 3 to 6 marks, whereas formerly the unfinished was admitted free and the polished product bore a tariff of 3 marks. Most attention is naturally devoted to the question of a protective tariff on raw iron, steel rails, ingot and billet steel and girders. Within the three decades from 1870 to 1900 the German iron and steel production has increased four and five fold, but during last year the home consumption declined materially owing to the domestic depression, while the export movement was maintained only by disposing of surplus products at sacrifice prices. The latest statistics of German iron and steel products exported for the six months of the current year ending July show an increase of 600,146 tons as compared with the exports during the same period last year, most of which was due to the unusually large exports to Great Britain and the United States.

Reduced Earnings of Iron and Steel Companies.

But the last annual meetings of the big iron and steel syndicates with headquarters at Düsseldorf, Hagen, Westphalia, Essen on the Ruhr and Hamm, Westphalia, do not reflect such sanguine results as might be drawn by the uninitiated who only make conclusions from the continued big German exports of iron and steel products. In some instances no dividends were declared and a loss account reported, while in others the dividend declarations were from two to four points below those of the prosperous years beginning with the establishment of the big iron and steel cartels in 1897 and continuing until the spring of 1901, after which the successive bank crashes, impaired credit and sudden slump in the home industrial market cut down all earnings. But this situation only brought about a more strenuous race for foreign markets on the part of the exporting combines and cartels, so that the unusually large surplus stocks which were formerly required for home consumption had to be disposed of in England, Austria-Hungary, the United States, Russia, South Africa and other open markets by offering contracts at much lower prices than other competitors could. This explained the remarkable encroachments of German iron and steel products in the British markets, and the fact that between German and English bidders the English consumer most often decided in favor of the German because of the exceedingly low contract prices.

Bewildered by Conditions in America.

We have also been entertained of late with fondly expressed hopes that Germany will turn the tables upon the United States as an iron and steel exporting nation. The first argument brought forth is the unusually large export of German iron and steel products, including raw iron, ingot and billet steel, steel rails, forge steel and bar iron, to the United States. Hitherto the man on the street who had visions of the "American invasion" was induced by misinformed and highly imaginative commentators to believe that the United States was not only Germany's greatest export rival in iron and steel products, but that the United States Steel Corporation were likewise contemplating encroachments upon the German home market by buying options on ore mines, mills and big works with which to gain a foothold in the German market. They have been somewhat bewildered by the turn of affairs, and cannot understand why the United States iron and steel industries, so well organized, highly capitalized and with such inexhaustible resources at their command, should come to Germany to buy iron and steel products. The professional interests explain this increase in German exports by stating that German iron and steel products are offered cheaper to United States consumers than by the United States Steel Corporation, and that independent consumers find the German market a refuge with which to counter the high prices of the combination.

But the most astute and rational observer realizes that this situation is only a temporary one, and that Germany not only cannot count upon continued exports to the United States, but must prepare itself to meet the competition of the United States steel and iron exporters in a much more formidable manner than heretofore. Instead of Germany reversing the tables and creating a balance of exchange in favor of the Empire, it will be the United States who will be Germany's creditor. For what the United States owes Germany for these iron and steel exports is more than made up by the increase in copper exports to Germany, in cotton, petroleum, agricultural machinery, tools and kindred articles which have made a permanent market for themselves in Germany. But in view of Germany's advanced attitude as an exporter of iron and steel it is regarded by the Reichstag and the Government as unnecessary to apply a protective tariff on such products as are exported. On the other hand, the Government tariff bill contains a tariff of from 4 to 20 marks on tools, agricultural machinery and such articles as have been imported in ever increasing quantities of late from the United States. The extraordinarily high tariff on tools, for example, is directly aimed at the United States trade, just as the discriminatory tariff on fruits is aimed against the California importations, the excessive grain tariff against the wheat, rye and corn imports from the United States, Russia, Argentine and Austria-Hungary.

The producers of raw material who are favored by cheap labor and by plentiful resources, so that no competition need be feared from England or the United States because of the higher wages paid there, do not urge a protective tariff with any special zeal. But the high protectionists may be found among the manufacturers, the tool makers and agricultural implement manufacturers whose goods meet American products in the home market. Those who place their argument for high tariff upon the Dingley law are looked upon by the better informed, such as Privy Councillor Goldberger, who recently made a seven months' inspection tour in the United States and wrote a volume on "The United States as the Country of Unlimited Possibilities," as misguided, inasmuch as there are no infant industries to protect in Germany of the kind that are fathered by the Dingley law. For Germany is explored, worked and prospected from one corner to the other, so that every coal vein, every iron ore bed and cement and alkali resources and raw products are already controlled by syndicates strong enough to defend themselves.

In the Reichstag the Social Democratic and Liberal parties are opposed to a protective tariff on the ground that it will create for Germany a similar family of trusts as exist in the United States. The agrarians who

want only protection for agricultural products likewise declaim with vehemence against high industrial tariffs, although failing to realize that they are guilty of harboring and encouraging agricultural and raw food trusts. Therefore the popular sentiment in Germany is against a high tariff, and leaves its advocacy to the isolated interests whose products meet with competition from foreign countries upon the domestic markets.

The Interests Favoring a Low Tariff.

The Central Industrial Union, composed of most of the leading industrial representatives of Germany, including the coal mine operatives and iron and steel interests of Rhenish Westphalia and Upper Silesia, the Southern German industrial provinces, assumes a moderate and even negative attitude toward protective tariffs. A meeting has just been held in Berlin at which it was decided to address a more emphatic appeal to the Government to provide no high industrial tariffs, but make provisions for the renewal of the reciprocity treaties under which German industries flourished as never before. The agrarians want to shatter these treaties, inasmuch as all the wealth and labor of the Empire are being gathered into the coffers of the industrial centers away from the agricultural regions. Their undisguised policy is to deliver a blow to the industrial prosperity of Germany, so as to force labor to come back to the farms at low wages, such as the agrarians formerly flourished upon. They therefore demand a minimum grain tariff which would be impossible as a basis for the negotiation of new reciprocity treaties with Russia, Austria-Hungary, Italy, Switzerland, Argentine and other countries, and would prohibit the enactment of most favored nation treaties with the United States and other countries having high tariffs.

The Demoralization of the Syndicates.

But the German iron and steel interests have not only confusion to encounter outside of their ranks in legislation, but also among themselves. The German iron and steel trade is controlled by large cartels which control all questions of production, supply for home consumption, supply for exports, scales of wages and prices for domestic consumers and for foreign bidders. The iron and steel trades are divided for convenience sake into six gigantic syndicates. There is the consolidated pig iron syndicate, with headquarters at Düsseldorf, and embracing the producers of the Rhine region, Westphalia, of Siegerland, Lorraine and Luxemburg districts. There is a syndicate which controls the output and sale of ingot and billet steel, known as the Halbzeug Verband, also with headquarters at Düsseldorf. The girder syndicate is also centered at Düsseldorf. These three big cartels occupy one building for their offices and also, though ostensibly working as separate syndicates, they are closely allied by agreements and a mutual understanding. The wire rod syndicate transacts its central business from Hagen in Westphalia; the plate syndicate from Essen and the drawn wire combine from Hamm, in Westphalia. Between these six syndicates there exists an agreement, so that the whole may be called an iron and steel cartel. These syndicates divide Germany into separate spheres and govern all questions of production, price and wages.

Most of these syndicates were completed during the years 1897 and 1898, during the upward flight of German commerce and the season of extraordinary speculation. The banks offered money in big volumes to the iron and steel syndicates, with which new factories and mills were built and the output capacity enormously increased. But with the Leipziger, Pommerische, Saxon and other big bank crashes the withdrawal of credit and the evidences of wholesale stock speculation and watering of capitalized corporations, the cartels faced their first storm, which is now about to break. The iron and steel syndicates are the first to reveal the rents and fissures caused by the recent bad times. The cement syndicate was dissolved some time ago, but is making efforts to reorganize. Now the rolling mill syndicate is on the verge of collapse, for the principal concerns have announced their intention of withdrawing from the agreement this fall. A general meeting has been called to prevent the collapse, but the situation is a critical

one in the extreme. The same is true of the pig iron syndicate, out of which a number of big members have already stepped and taken up front against the syndicate. It must be understood that the German cartels are not capitalized combines, and do not assimilate the capital stock of the various concerns.

Syndicates Cannot Endure Trade Depression.

The giant steel and iron syndicates were formed for the purpose of preventing competition, rate cutting and wasteful overproduction, as the preventive advantages. The positive advantages were to be an organization for the purpose of maintaining good prices at home, to act in unison, to increase the exports of iron and steel, to restrict production according to the demand and to maintain a fixed scale of wages. In all these points the iron and steel cartels worked beautifully during flush times. But as soon as the depression came along there were cries of mutiny and discontent. One by one, individual firms disobeyed the rules of the cartel to dispose of their products secretly to home consumers at lower figures than fixed by the cartel. Penalties were applied in vain. Added to this there came a storm of public indignation because the cartel named higher prices for home consumers than for export, so that it was possible for the British manufacturer and bidder to obtain cheaper German iron and steel products than the German consumer in his home market. This created the so-called Protective Consumers' League, who have acquired a big influence politically because they have the masses on their side.

The iron and steel syndicates of Germany are not only wrestling, therefore, with unknown quantities in the solution of the tariff problem, but also with disintegration and the prospect of a collapse of the cartel system as hitherto prevailing. The exports to the United States have given the only incentive to the iron and steel market, which has been exceedingly weak, in sympathy with the general industrial market. But this item is regarded as only a passing one, although it is understood that orders have been placed here by American importers which will keep a certain portion of the mills and mines busy until the fall of 1903. The solution of a tariff policy, however, is the first necessary factor before the iron and steel trade can again maintain an organized front.

C. A. L.

Building Special Rolling Mill Machinery.

Kane & Roach of Syracuse, N. Y., who have been conspicuous as makers of blacksmith and wheelwright and wagon machinery, are going extensively into the building of special rolling mill machinery. W. E. Kane has designed a large line of special rolling mill machinery, especially straightening machines for straightening all classes of rolled product, such as pipe, rod, square and flat bars, angle irons, channel beams, I beams, rails, &c. Other special rolling mill machinery will be built, and it is the intention of the firm to bid on and build any size or style of special machines which may be required in rolling mill practice. The firm are also building several large special machines for machine shops, among them being extra large radial drills. One of the most important machines for machine shops which is now being constructed at the Syracuse plant is a combination machine for machining extra heavy castings weighing several tons, and which are too large to be placed on planers, boring mills and the ordinary tools now on the market. This machine is so constructed as to do any piece of work that is now done on the ordinary line of machine tools. The machine will do the drilling (horizontal or vertical), all kinds of boring, milling, and traversing, horizontally or vertically, the turning or planing, or in fact any of the operations of the usual tools, with but one setting of the casting. Several of the operations can be performed simultaneously. The machine is so constructed that the work can travel and the heads and working tools stand stationary, or so that the casting can be bolted to the base and the tools travel over the work.

The machine which is now being built of this type will be employed by the firm in their own shops, which

are now undergoing considerable extension. A full line of the machines will be worked out and built for the market.

The Tin Plate Settlement.

After continuous sessions lasting for nearly a week the American Tin Plate Company have reached an understanding with the Amalgamated Association at Pittsburgh in regard to the proposed reduction of 25 per cent. in wages on tin plate for re-export. It will be recalled that some months ago the American Tin Plate Company made a proposition to the Amalgamated Association that they could probably secure the drawback tin plate business if the Amalgamated Association would agree to accept a cut of about 25 per cent. in wages when rolling tin plate to be used in this export trade. It was pointed out to the Amalgamated Association by the officials of the American Tin Plate Company that if the men would agree to accept this reduction it meant the making in this country of a considerable quantity of tin plate. In one year the drawback plate business reached a total of 1,600,000 boxes, but it has not been as large since then, nor is it likely under present methods of selling foreign drawback plates to the large consumers here to reach such a total. The proposition was submitted by the Amalgamated Association officials to the different lodges and it was voted down almost unanimously. Upon the urgent solicitation of President Shaffer of the Amalgamated Association a second vote was taken, and while a number of lodges that had first voted against the proposition voted the second time in favor of it, yet not a sufficient number of lodges voted in favor of the proposition to carry it. Finally, President Shaffer called a special session of the tin plate section of the Amalgamated Association to confer with the officials of the American Tin Plate Company, and this special session convened in Pittsburgh, commencing on Monday, October 20. Daily sessions were held until Friday, October 24, when a settlement of the question was reached.

Instead of agreeing to accept a straight reduction of 25 per cent. in wages when working on drawback tin plate, the men have agreed to grant a concession of such part of a reduction in wages of 3 per cent. as may be necessary to reimburse the American Tin Plate Company in securing drawback tin plate business. The scale remains intact. The agreement reached will be best understood by printing the following clause of the contract made between the American Tin Plate Company and the Amalgamated Association:

"The American Tin Plate Company agree not to take during the period of this contract more re-export business than would require a general 3 per cent. concession from scale rates and also that the fund thus created shall be held in trust to reimburse the American Tin Plate Company for rebates paid on presentation of documentary evidence satisfactory to a committee of your association indicating that the American Tin Plate Company have paid such rebates."

This agreement was signed on Friday night by W. M. Leeds in behalf of the American Tin Plate Company and Theodore Shaffer, President of the Amalgamated Association, and it is understood it is to be in effect during the scale year, which ends July 1, 1903. It is natural that the American Tin Plate Company will make every effort to secure as much as possible of the drawback tin plate trade. It should be noted that the Amalgamated Association agrees to make the same concession to independent tin plate mills who sign the Amalgamated scale.

The fact that a settlement has been reached on the above basis has been received by the tin plate trade with a good deal of satisfaction, as it will no doubt insure to American tin plate mills a great deal of trade that heretofore has gone to tin plate mills in Wales. Some of the idle plants of the American Tin Plate Company will be put in operation as soon as the demand for tin plate warrants it.

H. C. Frick of Pittsburgh has been elected a director of the Equitable Trust Company of New York.

MANUFACTURING.

Iron and Steel.

The Campbell Iron Company, St. Louis, Mo., have filed notice of an increase in their capital stock from \$60,000 to \$120,000. The assets are placed at \$185,500 and the liabilities at \$41,000.

The rod mill at the Rankin works of the American Steel & Wire Company, at Rankin, Pa., has been idle for about a week on account of the main shaft of the large engine breaking. It is being repaired as rapidly as possible.

The additions to be built to their present plant by the Titusville Iron Company, Titusville, Pa., are being pushed to completion as fast as possible. The buildings are being erected by the American Bridge Company, the main structure being 200 x 420 feet and containing 760 tons of steel. The plant will be equipped with hydraulic riveters, electric cranes and 300 horse-power boilers. It will also contain six gas engines. The company recently increased their capital stock from \$250,000 to \$500,000.

The Helmbacher Forge & Rolling Mill Company, St. Louis, Mo., have begun operations at their rolling mill in Madison, Ill.

The Ashland Iron & Mining Company, Ashland, Ky., have under consideration the erection of another furnace.

General Machinery.

Orpnt & Rogers, Platteville, Wis., have leased the Schroeder mill building, in which they will install complete machine shop equipment for the manufacture of mining machinery and supplies.

The Aurora Automatic Machinery Company, Aurora, Ill., manufacturers of cycle parts, coaster brake hubs, gas engines for motor cycles and automobiles, pneumatic drills and appliances, &c., are about doubling their capacity by the addition of two stories to their plant. Most of the required machinery, including automatic screw machines, parallel grinders, Jones & Lamson turret lathes, milling machines and other necessary tools, has been purchased.

The American Foundry & Machine Shops, Crowley, La., have been purchased by the Champion Iron Works of that city, who will consolidate the two plants. The Champion Company have in course of construction a new building, 84 x 180 feet, which will be used for light machine work and blacksmithing, while the heavy foundry work will be done in the building on the Southern Pacific tracks which they recently bought. The officers are Henry Loewer, president; M. D. Abbott, vice-president, and Ben Stagg, secretary and treasurer.

The Allen G. Williams Machinery Company, Baltimore, Md., have incorporated with a capital stock of \$10,000. The company will carry a full line of shoe machinery and machine parts and have already leased a three-story warehouse at 214 North Holliday street. J. E. Martindale is secretary.

The recently organized Decatur Bridge Company, Decatur, Ill., require complete equipment of machinery for their proposed new plant. Address E. B. Tyler, Muncie, Ind. (See *Bridges and Buildings*.)

The Steam Electrical & Equipment Company of Pittsburgh have recently made sales of machinery as follows: One 100 horse-power Sterling boiler to Knott & Van Arnam Mfg. Company; one 125-ampere generator, to the Ampere Electrical Company; a consignment of Wagner motors, to the Republic Belting Company of Akron, Ohio, and the Cohen Block & Signal Company of Allegheny, Pa. They report that they have for sale several complete power plants, including Corliss engines, boilers, generators, &c.

The Chicago Pneumatic Tool Company, Chicago, report recent large sales of pneumatic tools to the Newport News Shipbuilding & Engine Company, Newport News, Va.; American Bridge Company, Philadelphia, Pa.; United States Navy Yard, Norfolk, Va.; Department Public Works, Sorel, Canada; New York Shipbuilding Company, Camden, N. J.; Pressed Steel Car Company, Allegheny, Pa., and several others. All of these sales were made as the result of competitive tests. Recent important contracts awarded the air compressor department include five cross compound compressors of 600 feet capacity each, for the Baltimore & Ohio Railroad; two compressors of 2000 feet capacity each, for the Pressed Steel Car Company; 2000-foot compressor, for the Kawasaki Dockyard, Japan; two 600-foot compressors, for the New York, Ontario & Western Railroad, and one 700-foot compressor for the signal department of the New York Central & Hudson River Railroad.

The Fairmount Foundry & Machine Works, Fairmount, Ind., have been merged into the Fairmount Machine & Tool Works. Machinery for the manufacture and repair of gas and oil well tools will be installed.

The American Pipe Mfg. Company, Philadelphia, have contracted for all the large items of machinery for the new pumping station at Charleston, S. C. The International Steam Pump Company, New York, will furnish the pumping machinery; the Stirling Company of Barberton, Ohio, the boilers; New York Continental Jewell Filtration Company, New York, the filters, and Alphons Custodia Company, Philadelphia, the brick stack.

About December 1 the H. P. Cameron Electrical Mfg. Company, Ansonia, Conn., will move into their new factory, at which

time, they advise us, they will need a large amount of new machinery. The company have recently been reorganized with a capital stock of \$50,000. They manufacture a complete line of commutators, commutator segments, armature coils, and deal in mica, street railway and electrical supplies. The officers are David Dawson, president; H. P. Cameron, vice-president and general manager; John Elliott, secretary, and Irving Whiting, treasurer.

Boilers, Engines, &c.

The Buffalo, Rochester & Pittsburgh Railroad Company, whose road runs from Pittsburgh to Rochester, N. Y., will within a few days place orders for 20 freight, 5 passenger and 5 switching engines for 1904 delivery. The greater part of the order will probably go to the American Locomotive Company. The action of this company in buying equipment for 1904 delivery shows a confidence on the part of the management that present prosperous business conditions will continue for some time. They placed orders some time ago for a very large amount of equipment to be delivered next year.

The Briggs Machinery Company of Pittsburgh have made recent sales of gas engines as follows: To the Riter-Conley Mfg. Company, a 125 horse-power three-cylinder Nash engine, for their Leedsdale plant; to the Monessen Water Company, Monessen, a 125 horse-power vertical Nash engine, which is a duplicate of one recently installed at this plant; two 100 horse-power Nash engines to the Riter-Conley Mfg. Company, to be installed in a plant they are building in Massachusetts; a 50 horse-power Nash for a 500-light electric plant, direct connected, for the Walker Block, McKeesport; an 8 horse-power New Era gas engine to Smith Brothers, Grant street, this city, and nine complete pumping plants, driven by small gas engines, to the H. J. Heinz Company, to be installed in their different plants.

The Smart-Eby Machine Company, Limited, Hamilton, Can., have changed their name to the Smart-Turner Machine Company, Limited, Mr. Eby, the former manager, having been succeeded by J. A. Turner. The company have a large amount of work on hand. The following are among their recent orders: A pair of triplex power pumps direct connected to two gas engines, for the corporation of Bridgeburg; tandem compound duplex direct acting pumping engine with boilers for the corporation of Newcastle, N. B.; pair of vertical high speed engines, direct connected to electric generators, for the Collingwood Shipbuilding Company, Collingwood, Ont.; Meyer cut off engine with boiler, heater, pump, &c., for the Dominion Harness Company, Port Elgin, Ont.; one 10-ton traveling crane and a duplex outside packed pot valve pump, for the Halifax Electric Tramway Company, Halifax, N. S.; one 5-ton traveling crane for I. Mathe-son Company, New Glasgow, N. S.; one 10-ton traveling crane for James Bodle, Granville, Que.; a duplex pot valve pump for the Beardmore Company, Acton, Ont.; duplex pumps for the Strathcona Coal Company, River Herbert, N. S.; Jacques Cartier Electric Company, Quebec; Deering Harvester Company, Hamilton, and the Canadian Rand Drill Company, Sherbrooke, Que.

A large manufacturer of machine tools in Cincinnati is desirous of receiving bids for a Corliss engine of 250 to 350 horse-power and a boiler, water tube preferred, of about one-third more capacity. Address Henry Smith, manager *The Iron Age*, Cincinnati.

W. F. Mayhew & Co., 1222 Marquette Building, Chicago, advise us that they are in the market for two 2,000,000-gallon pumps and two 350 horse-power boilers. The firm have been granted a franchise for water works at Jacksonville, Ill., the construction of which will cost about \$500,000.

The municipality of De Smet, S. Dak., has voted to issue \$13,500 of bonds for water works and \$6500 for electric lighting. Work on the plants will probably be started this fall. A. N. Waters is mayor and J. C. Gipson city auditor.

John W. Wilson, president, Edinham, Kan., advises us that bids will shortly be received for an electric plant, estimated cost of which is \$5000. An 80 horse-power boiler, 60 horse-power engine and a 500-light generator will be required.

The Marion Light & Heating Company, Marion, Ind., are preparing to build a new plant, work on which will be started early in the spring.

Foundries.

I. S. Spencer's Sons, Guilford, Conn., iron and brass founders and machinists, have incorporated under the same name. The business will be continued along the same lines as heretofore.

The Morgan Iron Works, Spartansburg, S. C., one of the largest foundries in that section of the country, will be sold at auction December 1.

The Manistee Iron Works Company, Manistee, Mich., advise us that they recently cast two large fly wheels for the Filler & Stowell Company of Milwaukee, Wis., one of them being a 16-ton wheel and the other measuring 15 feet in diameter with 42-inch face.

Kelly & Taneyhill Company, Waterloo, Iowa, will enlarge their foundry department. Patterns have been purchased of Frank Megow of Independence, Iowa, who will have charge of the foundry. The company will make builders' castings and fill contracts for structural steel.

The Ideal Heating Company, Oskaloosa, Iowa, of which Chas. Phelps is president and Anna Phelps secretary and treasurer,

have begun to pull down their foundry on South Market street, and the brick and building material will be removed to a lot on North First street adjoining the machine shop, where it will be used in the construction of a new foundry. New and up to date machinery will be installed and the plant will be operated by electricity. The company manufacture pipe fittings, valves, radiators, plumbing goods, &c.

The Thos. D. West Foundry Company are extensively enlarging and remodeling their ingot mold foundry at Sharpsville, Pa., replacing their present cranes with electric travelers and installing complete electrical power equipment, to provide for a new system of making ingot molds. They expect to increase their capacity to 400 tons per day.

At the recent annual meeting of the Vulcan Iron Works, New Britain, Conn., the following officers were elected: William A. Grippin, president; Hiram Oldershaw, secretary, and William P. Bacon, treasurer.

The De Kosenko Mfg. Company, Philadelphia, are building a second-story addition to their foundry.

The Three Rivers Foundry & Machine Company, Three Rivers, Mich., have effected a temporary organization by the election of W. W. French as president, L. B. Place vice-president and F. B. Watson secretary. The company will utilize the foundry at the Eames Pulley Company's plant and expect to be in operation by November 1.

Boilers, Engines, &c.

The city of Huntsville, Ala., have canceled their lighting contract with the Huntsville Railway, Light & Power Company, and are now having plans prepared for the plant they propose to erect. H. C. Pollard is city clerk.

Mena, Ark., will soon call for bids for constructing water works, for which \$25,000 will soon be available. John H. Hamilton is secretary of the commission.

Boilers and engines are required by the Decatur Bridge Company, Decatur, Ill., for their new plant. Address E. B. Tyler, Muncie, Ind. (*See Bridges and Buildings.*)

The Val Verde Copper Company, Limited, Val Verde, Ariz., are installing about \$30,000 worth of additional equipment, among which will be a new 30 horse-power De Laval steam turbine and dynamo, 60-ton Chisholm, Boyd & White briquetting machine with 100 horse-power boiler and 60 horse-power upright engine for direct connection to blower, crushers, &c.

The Geo. D. Pohl Mfg. Company, Vernon, N. Y., manufacturers of gas and gasoline engines, are erecting an addition to their plant which will double the present capacity. Very little new machinery will be required.

The Evansville & Princeton Traction Company, Evansville, Ind., have purchased two 600 horse-power Corliss engines from the Lane & Bodley Company, Cincinnati, Ohio, and three 300 horse-power Sterling boilers.

E. R. Gustavus, proprietor of the Reliance Boiler Works, Oshkosh, Wis., is building a boiler which is said to be the largest ever made in Wisconsin. The boiler is to be of the internally fired type; it contains two 50-inch Morrison suspension furnaces and 161 tubes each 3 1/2 inches by 13 feet and has a capacity of 300 horse-power with 130 pounds working pressure. The boiler is being made for the Riverside Fiber & Pulp Company, Appleton, Wis.

Fires.

The plant of the Forst Hardwood Mfg. Company, Little Rock, Ark., was destroyed by fire October 28. The loss is about \$100,000.

The machine shops of the University of Arkansas, Fayetteville, were recently destroyed by fire, entailing a loss of about \$50,000.

The chemical works of George Leuders & Co., South Elizabeth, N. J., were destroyed by fire October 24. The loss is about \$30,000.

The Fairmont Powder Works, Fairmont, W. Va., were damaged to the extent of \$30,000 by an explosion October 26.

The stoker works of the Wilkinson Mfg. Company, Bridgeport, Pa., were damaged \$4000 by fire October 25.

Bridges and Buildings.

The Elizabeth Steel Bridge Works of Elizabeth, Ill., George Skene, proprietor and general manager, have concluded to move their establishment to Topeka, Kan. Several hundred tons of structural material have already been ordered delivered at Topeka. The company's shop will be operated by electricity and will be equipped throughout with pneumatic labor saving machinery. The establishment at Elizabeth has been in operation about ten years.

T. L. Blackburn, Melville Wood, E. B. Tyler and George Caldwell, all of whom were formerly connected with the Indiana Bridge Company, Muncie, Ind., have organized the Decatur Bridge Company and will erect a plant at Decatur, Ill., for the manufacture of bridges and structural steel work. There will be a main building 70 x 200 feet, blacksmith shop 40 x 50 feet, engine room 25 x 30 feet, boiler room 25 x 30 feet, office building, storehouses, &c. No machinery has as yet been purchased. Address E. B. Tyler, Muncie, Ind.

Hardware.

Kitselman Bros., Muncie, Ind., are erecting additional warehouses for the storage of wire and wire goods. One building is frame, 100 x 150 feet; the other of brick construction, 50 x 160 feet.

The Garden City Iron & Wire Works, Chicago, announce that they have changed the style of the company to the Globe Iron & Wire Works.

Hale & Kilburn Mfg. Company of Philadelphia and New York recently decided to move their large plant, long located in the heart of Philadelphia's business section, and with a view of increasing facilities purchased a large tract of land on the main line of the Pennsylvania Railroad near Germantown Junction to meet this requirement. The company's present factory is greatly overcrowded in all its departments, and to relieve this condition and also to provide better shipping facilities a site 250 x 750 feet was purchased. The buildings will cover the entire block bounded by Lehigh avenue, Eighteenth street, Glenwood avenue, Margie street, and the Pennsylvania Railroad tracks. This company manufacture a large line of patented furniture specialties, such as the parlor telescope bed, the Hale convertible sofa, reservoir washstands, patented water coolers, sanitary commodes, Morris chairs, &c. The company also manufacture improved car seats for railroad use. The manufacture of these various lines will require about 250,000 square feet of floor area in the new plant. Thoroughly modern and up to date buildings will be erected, which will include lumber drying sheds, large dry kilns, a complete wood working mill, cabinet shop, finishing room, spring department, upholstery department, stained glass department, machine shop, forge shop, storehouse, warehouses, dining room for employees, offices, stables and power house. The buildings will be of the best slow burning factory construction. About 300 horse-power will be developed on direct coupled dynamos and the power distributed by an alternating electric current.

The Richmond Handle Company, Richmond, Ind., have been incorporated with a capital of \$10,000 by J. W. Maxim, Geo. H. Maxim and J. A. Greenstreet of New Castle.

At the recent annual meeting of the stockholders of the Sawyer Tool Mfg. Company, Fitchburg, Mass., the following officers were chosen: President, Lyman H. Goodnow; vice-president, James F. D. Garfield; treasurer, Edmund D. Garfield; directors: L. H. Goodnow, J. F. D. Garfield, Emory E. Ellis. Mr. Ellis succeeds B. E. Sawyer on the Board of Directors, as Mr. Sawyer has sold out his entire interest in the company. Mr. Ellis was re-elected manager.

Miscellaneous.

Officials of the American Shipbuilding Company, Cleveland, have approved plans for the largest dry dock on the lakes, to be erected at the Milwaukee yards of the company. It will be 600 feet long, 70 feet wide, with a depth of 16 feet over miter sills. The improvements will cost \$100,000, and were made necessary through the growing tendency of lake vessel owners to build larger and longer boats. The present largest lake dry dock is at Lorain, Ohio, which is 560 feet long.

At Pittsburgh application has been made by the defendants for a new trial in the case of James McNeil & Brother against the Crucible Steel Company of America. The plaintiffs were recently awarded \$46,746.94 for damages done to their plant by a boiler explosion at the Black Diamond Steel Works of the Park Steel Company, now controlled by the Crucible Steel Company of America.

The National Spring & Wire Company, Albion, Mich., have incorporated for the manufacture of vehicle and furniture springs under the Bates patent. They will install a new plant, the machinery for which will be furnished by the Hoefer Mfg. Company of Freeport, Ill. J. S. Shanley is interested.

The American Can Company have abandoned their Los Angeles, Cal., plant, which has had an output of 70,000 cans per day; the machinery is being removed to San Francisco and Portland. The company will enlarge their plant on Fortieth street, Chicago, by the erection of a five-story warehouse, 67 x 118 feet.

The plant of the Pacific Coast Pipe Company at Spokane, Wash., which was recently destroyed by fire, will be rebuilt. One building, 100 x 200 feet, will be constructed at once, and in the spring there will be a large addition. The capacity of the new works will be from 3500 to 5000 feet of 6-inch pipe per day.

The Elkhart Brass Company, Elkhart, Ind., are installing machinery in their new factory building, which they expect to have in operation within the next few weeks. Orders are in hand for immediate execution, but the company are hampered by an inadequate supply of coke.

A. M. Crane & Co., Incorporated, Chicago and New York, have recently taken contracts for structural steel, aggregating between 1200 and 1500 tons, for various buildings being constructed in Chicago and elsewhere, among them being a boiler house for the Schoenhoefer Brewing Company, Chicago; the American Steam Pump Company, Battle Creek, Mich., and the King Building

and the improvements on the Royal Insurance Company's Building, Chicago. The material is largely of domestic manufacture, but some importations of German steel have been made.

The Duty on Steel Billets

A meeting of the importers of steel billets was held in New York on Tuesday, during which additional data relative to prices were collected and prepared.

It was understood that the decision of Colonel Jewell, the appraiser in charge, would be rendered to-day. The formal decision was not, however, ready this afternoon. Colonel Jewell, however, stated to a representative of *The Iron Age* that there is to be an advance of 10 marks per 1000 kg. on the invoice price, so as to bring the price up to the home market in Germany. Colonel Jewell did not state to what invoices this applied. This advance, according to the appraiser, "does not change the rate of duty, making it 0.3 cent per pound." The decision, however, leaves unchanged the question of the penal duty. An appeal may possibly, according to Colonel Jewell, come up next week from the importers, and the decision thereupon will be final.

PERSONAL.

S. S. Gould has been elected vice-president of the Wood Shovel & Tool Company of Piqua, Ohio, having recently resigned the position of vice-president of the St. Louis Shovel Company of St. Louis, Mo.

A decree in the distribution in the estate of the late A. M. Byers, a well-known iron manufacturer of Pittsburgh, made in that city last week, shows a balance of \$4,790,010.73, this being the value of the personal estate. The executors, Dallas C. Byers and John D. Lyon, for their services received \$64,679.93. Of the balance, \$4,700,330.80 goes to Maude F. B. Lyon, Martha F. Byers and D. T. Watson, trustees under the will. In the distribution \$25,000 is suspended to cover the charges of litigation now pending.

P. G. Jenks, formerly assistant treasurer of the Pressed Steel Car Company, has been appointed treasurer, with headquarters in Pittsburgh.

A. S. Matheson of the National Tube Company has been elected a director of the Pressed Steel Car Company.

Harry Menough has resigned as superintendent of the National Steel Company's plant at Mingo Junction, Ohio, and will engage in the manufacture of steel castings at Wellsville, Ohio.

The founder of the Cambria Iron Company, George S. King, celebrated the ninety-third anniversary of his birth at Johnstown, Pa., on Tuesday.

The officers announced for the ensuing year by the American Society of Mechanical Engineers are as follows: President, Wm. Sellers, Philadelphia; treasurer, F. H. Stillman, New York City; vice-presidents, F. H. Daniels, Worcester; James Christie, Philadelphia; John R. Freeman, Providence, and managers, R. C. McKinney, New York City; S. S. Webber, Trenton; Newell Sanders, Chattanooga.

The Malleable Casting Consolidation.—It was reported that a meeting of manufacturers of malleable iron castings was to be held in New York on Wednesday, October 29, with a view of perfecting plans for a consolidation. Max Pam and Elbert H. Gary were said to be interested in the negotiations. Mr. Pam stated to a representative of *The Iron Age* that he knew of no meeting scheduled for the date reported, and that such a meeting was quite impossible, as some of the interested parties were not in New York. He said that a trade meeting of certain malleable iron interests was to take place next week. He said that he had been approached on the subject of the projected consolidation, but had as yet taken no definite action in the matter. The list of concerns who are reported to be parties to the negotiations includes all of the principal malleable iron producers, with the exception of the National Malleable Castings Company.

The Iron and Metal Trades.

In spite of extremely favorable surface conditions there are many in the Iron trade who express the conviction that the crest of the wave has passed and that the tendency in the opposite direction will develop. Conditions are unusual in many respects, but the one fact which dispels any danger of a sudden collapse is that raw materials and notably fuels are scarce, without much hope of improvement until well into next spring.

The announcement that the Frick Coke Company have named \$3 at ovens for Connellsville Furnace Coke for the next year is highly interesting. It is in line with the conservative policy of the United States Steel Corporation, but it may not mean as much as appears on the surface. It is understood that the demands of the constituent companies will be so much larger next year that the Coke company will not be able to supply many outside furnaces which have long depended upon that source, and that the other Coke producers are not likely to follow the price policy of the corporation, but will demand and are getting higher prices.

The Frick Coke Company have not announced any prices on Foundry Coke, and there are indications that this field will be less cultivated in the future.

From authoritative sources it is learned that the negotiations between the United States Steel Corporation and the Valley furnaces for 250,000 to 300,000 tons of Bessemer Pig for delivery after April 1, 1903, have been discontinued. In the meantime Bessemer Pig continues exceedingly scarce and is commanding high prices for early delivery. There are some indications that importations may be resorted to.

In Foundry Iron the event of the week has been the meeting of the leading Southern interests, as the result of which the announcement is made that for the second half of 1903 the furnaces have determined upon prices on the basis of \$20 for No. 2 at Birmingham. It appears that the trade is not taking this decision very seriously.

There is a scarcity of Forge Iron in the Central West, and quite a large inquiry is now in the market.

From Germany comes the report that there is a good deal of trouble over renewing the Pig Iron syndicate, owing to the usual disagreement over percentages. If this powerful syndicate should fail the low prices resulting in the home market might affect the capacity to make low export prices on Steel and put an end to syndicate export bounties.

In the Steel trade we may note a renewal of negotiations for the importation of Steel Billets, which can now be laid down at Atlantic ports at a shade under \$27.50.

Some of the large Western roads have been caught napping in failing to arrange for a supply of Steel Rails, and there is apparently a further chance for importations.

In the Finished lines the most interesting fact is that the Pennsylvania Railroad has contracted for an aggregate of 31,000 tons of Bridge Material, the outside works coming in for a goodly share. The deliveries are to be made during the next six months. While thus the demand continues exceedingly strong in this branch, the building trade is showing a disposition to slacken. Importations of Structural Material continue.

It is expected that the announcement of revised prices on Tin Plate will be made early next week. The amount of the reduction is closely guarded.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one month and one year previous.

Oct. 29, Oct. 22, Oct. 1, Oct. 30,

1902.	1902.	1902.	1901.
PIG IRON:			
Foundry Pig No. 2, Standard,			
Philadelphia	*\$22.50	*\$22.00	*\$22.00 \$15.00
Foundry Pig No. 2, Southern,			
Cincinnati	*22.25	*22.25	*22.25 13.75
Foundry Pig No. 2, Local Chicago	*23.00	*23.00	*23.00 14.75
Bessemer Pig, Pittsburgh.....	*21.75	*21.75	*21.75 16.00
Gray Forge, Pittsburgh.....	*21.75	*20.50	*20.75 14.10
Lake Superior Charcoal, Chicago	*26.00	*26.00	*26.00 17.00

BILLETS, RAILS, ETC.:

Steel Billets, Pittsburgh.....	29.50	29.50	29.50 27.00
Steel Billets, Philadelphia.....	†27.50	†28.00	†27.00 28.00
Steel Billets, Chicago.....	†29.00	Nom.	†29.50
Wire Rods, Pittsburgh.....	36.00	36.00	35.50 35.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00 28.00

OLD MATERIAL:

O. Steel Rails, Chicago.....	19.00	19.00	19.00 14.00
O. Steel Rails, Philadelphia....	21.50	21.50	21.50 17.25
O. Iron Rails, Chicago.....	25.00	25.00	25.00 21.00
O. Iron Rails, Philadelphia....	24.50	24.50	25.00 21.60
O. Car Wheels, Chicago.....	24.00	Nom.	21.00 16.00
O. Car Wheels, Philadelphia...	19.00	19.00	19.75 15.00
Heavy Steel Scrap, Chicago....	18.50	18.50	18.50 13.50

FINISHED IRON AND STEEL:

Refined Iron Bars, Philadelphia.	1.92	1.92	1.92 1.65
Common Iron Bars, Chicago....	1.80	1.80	1.85 1.70
Common Iron Bars, Pittsburgh.	1.80	1.80	1.80 1.55
Steel Bars, Tidewater.....	1.75	1.75	2.00 1.62½
Steel Bars, Pittsburgh.....	1.60	1.60	1.60 1.55
Tank Plates, Tidewater.....	2.10	2.10	2.00 1.75
Tank Plates, Pittsburgh.....	1.90	1.90	1.75 1.60
Beams, Tidewater.....	2.00	2.10	Nom. 1.75
Beams, Pittsburgh.....	2.10	2.10	Nom. 1.60
Angles, Tidewater.....	2.00	2.10	Nom. 1.75
Angles, Pittsburgh.....	2.00	2.00	Nom. 1.60
Skelp, Grooved Iron, Pittsburgh.	1.95	1.97½	2.02½ 1.80
Skelp, Sheared Iron, Pittsburgh.	2.05	2.10	2.10 1.85
Sheets, No. 27, Pittsburgh.....	2.65	2.65	2.75 3.00
Barb Wire, f.o.b. Pittsburgh....	2.45	2.50	2.50 2.90
Wire Nails, f.o.b. Pittsburgh...	1.85	1.90	1.90 2.25
Cut Nails, Mill.....	2.05	2.05	2.05 2.05

METALS:

Copper, New York.....	11.75	12.00	11.55 16.85
Spelter, St. Louis.....	5.20	5.25	5.30 4.12½
Lead, New York.....	4.10	4.10	4.10 4.37½
Lead, St. Louis.....	4.00	4.00	3.97½ 4.25
Tin, New York.....	26.75	26.25	25.30 24.85
Antimony, Hallett, New York...	7.75	7.75	7.75 8.50
Nickel, New York.....	40.00	40.00	40.00 60.00
Tin Plate, Domestic, Bessemer,			
100 pounds, New York.....	4.19	4.19	4.19 4.19

* For 1903. † Foreign.

Chicago.

FISHER BUILDING, October 29, 1902.—(By Telegraph.)

The inadequate transportation facilities of the railroads are probably the most important factor governing the Iron and Steel situation at the moment. The resumption of work at the Anthracite mines has intensified the difficulty previously experienced. Neither Iron nor Coke is being moved with the promptness and dispatch necessary to satisfactory working of furnaces, Coke ovens or foundries. The accumulation of Coke at the ovens is interfering with production, and even when moved it is often confiscated by the railroads. Sidings at various places are overflowing with loaded cars, for which no motive power is available. This congestion of cars is responsible for a famine in other sections, and hundreds of second-hand cars are being rushed to car works to be prepared for temporary service throughout the Central States and Northwest. Under the circumstances it is not surprising that the demand for spot Iron in small quantities continues active; but even so, supplies of both domestic and foreign Iron seem to be ample to meet current wants. Some little business is being done for the remainder of the year, but there are few buyers in the market for delivery during the first half of next year, and for delivery beyond the second half consumers are indifferent; but the sentiment favors lower prices for the last half, although producers hope to maintain the present level of the first half. The action of the Frick Coke Company in regard to the discontinuance of agencies is considered significant. Bar Iron is heavy and prices are barely sustained. Soft Steel Bars are not moving with the freedom anticipated and new business is relatively light. Independent producers of Bars and Structural Shapes and Sheets are exhibiting un-

expected vitality, and consumers are reaping some benefit in time of shipment at least if not in prices. In exceptional instances the 1.75c. basis has been shaded. The rumor of lower prices to be made on 4-inch and under of Merchant Pipe is resulting in consumers refusing to buy except at guaranteed prices, with allowances for lower prices on stocks should a decline materialize. There is little new business in Merchant Steel, and shipments on previous contracts are being held up for lack of transportation facilities, some large producers announcing that they are accumulating at the rate of 1000 tons per day because railroads refuse and are unable to move the metal. Plates also are less active, but are relatively firm. The only point of activity is in Steel Rails, for which a large tonnage of domestic is pending for next year's delivery, and negotiations are about to be closed for a considerable quantity of foreign Sections for early shipment. Some railroads in the Northwest are unable to obtain needed Rails for this year's delivery and are endeavoring to purchase Relaying Rails, but even these are scarce. Old Material is not developing the weakness anticipated, but mills are not active buyers. Some foreign Structural Material and Blooms have been sold during the week, but nothing is doing in Billets pending settlement of the duty question.

Pig Iron.—The demand for spot Iron in small quantities has continued active and in some cases even urgent, enabling furnaces to obtain full prices for Foundry grades, and especially for Strong Irons, High Silicon brands and Charcoal grades. There is also a fair inquiry at relatively high prices for Foundry and Bessemer grades for delivery during the next 60 days. It is evident that the high prices current are attracting a more ample supply of spot and November-December metal to this market. For delivery during the first half of next year there is very little inquiry, and only sporadic sales upon the basis previously quoted, with the exception of Malleable Iron, both Standard and Bessemer, upon which furnaces have made lower prices, the offerings now being based on \$21 at the furnace. Buyers show no disposition to make contracts for the second half of 1903—that is, for Foundry Iron—and it is evident that they anticipate lower prices. On the other hand, Southern furnaces hope to maintain the present level of the first half, \$20 for No. 2 Foundry, Birmingham. One of the most interesting developments of the week is the report that 30,000 tons of foreign grades destined to Chicago is in transit. This Iron, the sale of which has already been reported, is to be distributed to various local consumers, but while the custom house reports may show large amounts of Iron booked for Chicago the opinion prevails that only a very small portion of it will reach local consumers. Some of it is coming by way of the Eastern seaboard, and will be delivered to various foundries east of Pittsburgh. Other lots are billed via New Orleans, and from there by rail up the Mississippi Valley. The fact that from 75 to 85 per cent. of domestic furnace production has been sold for the first half of 1903 maintains prices, but there is an easier undertone apparent, buyers being more and more indisposed to contract for future delivery beyond the first of the year. New sales during the week have been relatively light, and will scarcely aggregate over 10,000 or 12,000 tons for all deliveries. Among the sales have been 750 tons of Southern No. 2 Foundry for November-December and 250 tons ditto October-November delivery on the basis of \$27.15, Chicago; 300 tons of Virginia High Silicon Iron at \$29.15, and several 100-ton lots ranging from \$29.15 to \$31.15, according to percentage of Silicon, all for prompt shipment; 1000 tons Southern No. 2 Foundry for delivery during the first half of next year on the basis of \$20, Birmingham. Standard Bessemer has been sold on the basis of \$22.75, Valley furnace, equivalent to \$24.85, Chicago. Other sales include a number of small lots of Ohio Strong Softeners and Lake Superior Charcoal, mainly for delivery during the first half of next year, but single car lots of Softeners have been sold for delivery during the current year. There have been further sales of foreign Iron in small lots for immediate delivery ranging from \$26 to \$28, duty paid, Chicago, but cargo lots are still offered at prices ranging from \$22 to \$24, duty paid, according to grade or analysis, for future delivery. Another feature of interest is the announcement that all agencies of the Frick Coke Company will be discontinued after December 31, 1902. The lack of Coke is still the one feature of great solicitude for both consumers and producers of Iron, and at present there is no prospect of early relief. The inadequate transportation facilities are the most embarrassing condition, and according to reports the congestion at the ovens will not only not be relieved soon but will operate to put many ovens into idleness. The following are the prices asked for delivery during the first half of 1903:

Lake Superior Charcoal.....	\$26.00 to \$27.00
Local Coke Foundry, No. 1.....	23.50 to 24.00
Local Coke Foundry, No. 2.....	23.00 to 23.50
Local Coke Foundry, No. 3.....	22.50 to 23.00
Local Scotch, No. 1.....	24.00 to 24.50
Ohio Strong Softeners, No. 1.....	25.50 to 26.50
Southern Silvery, according to Silicon.....	24.10 to 24.50
Southern Coke, No. 1.....	24.15 to 24.65
Southern Coke, No. 2.....	23.65 to 24.15
Southern Coke, No. 3.....	23.15 to 23.65
Southern Coke, No. 1 Soft.....	24.15 to 24.65
Southern Coke, No. 2 Soft.....	23.65 to 24.15
Foundry Forge.....	22.15 to 22.65

Southern Gray Forge.....	21.65 to 22.15
Southern Mottled.....	21.65 to 22.15
Southern Charcoal Softeners, according to Silicon.....	27.15 to 27.65
Alabama and Georgia Car Wheel.....	27.00 to 27.50
Malleable Bessemer.....	23.50 to 24.00
Standard Bessemer.....	23.00 to 23.50
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon.....	27.60 to 28.60

Bars.—As far as Bar Iron is concerned, specifying on old contracts has continued very meager and new business has been mainly in small amounts, prices ranging from 1.80c. to 1.85c., Chicago, mill shipment. In some instances the inside price has been shaded, and only single cars have been sold at the outside price. But most of the contracts now on the books are at lower prices, and were it not for the scarcity and relatively high prices prevailing for Scrap present prices could not prevail. The situation in Steel Bars is also unsatisfactory, new business being light and specifying on old contracts not being what has been anticipated. It is gratifying to report, however, that some new business—one lot for 900 and one lot for 750 tons—has been taken during the week from car works and agricultural implement manufacturers for early delivery. The specifying during the month of October on Soft Steel Bars and also on Hoops has shown a decided improvement over the previous month, but Small Angles are more plentiful and dull. The following are the prices current: Soft Steel Bars, 1.75c. to 1.85c.; Hoops, 2.15c. to 2.25c.; Angles, 1.85c. to 1.95c., base, mill shipment. The store trade has been light and prices have been without essential change. Bar Iron is selling at 2.15c., Soft Steel Bars at 2c. to 2.25c., Angles at 2.50c. and Hoops at 2.40c. to 2.50c. from store.

Structural Material.—There has been a fair demand for small amounts of Shapes for immediate shipment from local stocks, but the mills have received very little new business, either for prompt or next year's delivery, and with the accumulation of small sizes the market is easier in tone, although prices are without essential change. There has been but little inquiry for foreign Material, but several hundred tons have sold for prompt shipment at 2.15c., delivered at St. Louis. For domestic Steel, mill shipments, prices are as follows: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 2c. to 2.25c. Local stocks are more ample and prompt shipment is now made for all but the very large sizes, which are scarce. The following are the prices current: Beams and Channels at 2.50c. to 3c., Angles at 2.50c. to 3c. and Tees at 2.55c. to 3.50c., at local yards.

Plates.—There is less demand for mill shipment, but there is a fair movement from local stocks, which have been replenished, and the tone of the market continues firm. The following are the prices current, mill shipment: Tank Steel, ¾-inch and heavier, 1.75c. to 2c.; Flange, 1.85c. to 2.10c.; Marine, 1.95c. to 2.20c. There is a good demand for small quantities for immediate shipment from local yards, and the following are the prices obtained: Tank Steel, ¾-inch and heavier, 2.25c. to 2.50c.; Tank Steel, No. 8, 2.35c. to 2.55c.; Flange, 2.45c. to 2.65c., all f.o.b. warehouse, Chicago.

Sheets.—While there has continued to be a fair degree of activity, the market remains easy under liberal offerings and keen competition. This is especially true of Galvanized, which is offered at 75 and 10 per cent. discount on the base price for mill shipment. The jobbing demand has been fair, but the market has continued easy, without essential change in prices, which are as follows: No. 20 Black Sheets sell at 2.60c. to 2.65c. and No. 27 at 2.80c. to 2.85c., mill shipment. For small lots from store 3.10c. to 3.20c., Chicago, is obtained. Galvanized Sheets are selling at 3.35c. to 3.40c. net, mill shipment, while small lots are selling at 3.80c. to 4c. net, from store, for No. 27.

Cast Pipe.—The market has continued quiet for all sizes, there being little demand for 8's and larger, but a fair inquiry for the smaller sizes, ranging from 4's to 8's. The larger manufacturers can make but small shipments of 6's until December 1. Manufacturers continue to sell small lots as follows: 4-inch, \$37; 6-inch, \$36; 8-inch and upward, \$35; Gas Pipe, \$1 per ton higher, all f.o.b. Chicago.

Billets.—There has been a moderate demand for domestic Open Hearth Billets, with sales of small lots ranging from \$36 to \$40, according to analysis, buyer and time of delivery. Business in foreign Billets continues to be held subject to settlement of duty, the nominal prices ranging from \$29 to \$30, delivered, Chicago, duty paid. Five hundred tons of foreign Blooms sold on the basis of \$37.50, delivered to consumers in this section, duty paid.

Merchant Pipe.—No improvement has been noted, buyers holding off in anticipation of lower prices and competition continuing. The following are nominal prices current, random lengths, from store, Chicago, subject to a discount of 10 and 5: Black, ¾ to ½ inch, 56½ off; ¾ to 12 inches, 63½ off; Galvanized, ¾ to ½ inch, 43½ off; ¾ to 12 inches, 50½ off. Some manufacturers are making the following prices for mill shipment, Chicago, random lengths, subject to a discount of 10 and 10: Black, ¾ to ½ inch, 58½ off.

$\frac{3}{4}$ to 12 inches, 65½ off; Galvanized, $\frac{1}{8}$ to $\frac{1}{2}$ inch, 46½ off; $\frac{3}{4}$ to 12 inches, 54½ off.

Boiler Tubes.—An advance of 2½c. has been established on Charcoal Iron Tubes, in sympathy with the high prices current for Charcoal Pig and Old Car Wheels. There is a fair inquiry and there is still considerable competition. Discount of 5, and in exceptional instances 5 and 2½, allowed over the following schedule for mill shipment:

	Steel.	Iron.
1 to 1½ inches.....	43½	40½
1½ to 2½ inches.....	56	38½
2½ to 5 inches.....	61	48½
6 inches and larger.....	56	38½

There has been a fair inquiry for small lots from store, but prices have not been fully sustained. The schedule, however, remains as follows:

	Steel.	Iron.
1 to 1½ inches.....	35	35
1½ to 2½ inches.....	47½	32½
2½ to 5 inches.....	55	42½
6 inches and larger.....	47½	..

Merchant Steel.—The volume of new business is light and shipments on old contracts are being delayed by lack of transportation facilities, one large manufacturer reporting stocks accumulating at the rate of 1000 tons a day, with 9000 tons already held up at the works. There is a fair current order trade for Tool Steel, for which the market is steady. For mill shipment prices are as follows: Smooth Finished Machinery Steel, 2c. to 2.10c.; Smooth Finished Tire, 1.95c. to 2.10c.; Open Hearth Spring Steel, 2.65c. to 2.75c.; Toe Calk, 2.25c. to 2.40c.; Sleigh Shoe, 1.85c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 47 off in carload lots and 42 off in less than car lots. Ordinary grades of Crucible Tool Steel are quoted at 6c. to 7c. for mill shipment; specials, 12c. upward.

Rails and Tracks Supplies.—This is the one point of strength and activity in the whole situation, the demand continuing urgent for Heavy and Light Sections for both this year's and next year's deliveries. In all, contracts for about 150,000 tons are pending for domestic Rails, and it is anticipated that the St. Louis & San Francisco road will place an order for 40,000 tons within the next few days. Offerings of foreign Rails are freer, with negotiations pending on one lot of 40,000 tons at about \$33.14, delivery St. Louis, duty paid. One lot of 3000 tons foreign Sections sold for delivery in Indian Territory at about \$33, duty paid, delivered. The demand for Light Rails continues unsatisfied. There is an urgent demand for Standard Sections for this year, but it is almost impossible to obtain domestic Rails either from first or second hands, and one contract for the Northwest will probably be satisfied by Relaying Rails, but even these are scarce, only lots of 1000 to 2000 tons being obtainable at \$32 to \$32.50, Chicago basis. Official prices for domestic Rails continue strong at \$28 for standard and \$27 for second quality, mill shipment, with sales of 1000 tons of the latter during the week for prompt shipment. Angles, Bars, Spikes, Nuts and Bolts continue to sell readily at full prices. The following are the prices current: Splice Bars or Angle Bars, 2c.; Spikes, 2.50c.; Track Bolts, with Hexagon Nuts, 3.10c. to 3.45c.; Square Nuts, 2.95c. to 3.10c.

Old Material.—The market has been without essential change, the offerings being only moderate, but the demand is not specially active and the changes in prices have been within narrow limits. In some instances No. 1 Railroad Wrought, Machine Shop Turnings and Stove Plates have commanded a slight advance. Sales have been confined to moderate amounts ranging from 100 to 800 tons, there being few sales of 1000-ton lots or over. Car Wheels have continued to be especially scarce and are in urgent demand at full prices. The following are the prices per gross ton, Chicago:

Old Iron Rails.....	\$25.00 to \$25.25
Old Steel Rails, mixed lengths.....	19.00 to 19.25
Old Steel Rails, long lengths.....	23.50 to 24.50
Heavy Relaying Rails.....	32.00 to 32.50
Old Car Wheels.....	24.00 to 25.00
Heavy Melting Steel Scrap.....	18.50 to 18.75
Mixed Steel.....	15.50 to 16.00

The following quotations are per net ton:

Iron Fish Plates.....	\$22.50 to \$22.75
Iron Car Axles.....	.. to 25.00
Steel Car Axles.....	23.50 to 24.00
No. 1 Railroad Wrought.....	21.25 to 21.75
No. 2 Railroad Wrought.....	18.50 to 19.00
Shafting.....	20.00 to 21.00
No. 1 Dealers' Forge.....	17.00 to 17.50
No. 1 Bushing and Wrought Pipe.....	15.00 to 15.50
Iron Axle Turnings.....	15.00 to 15.50
Soft Steel Axle Turnings.....	14.50 to 14.75
Machine Shop Turnings.....	14.00 to 14.50
Cast Borings.....	10.25 to 10.75
Mixed Borings, &c.....	10.50 to 11.50
No. 1 BOLLERS, cut.....	14.50 to 15.00
Heavy Cast Scrap.....	17.00 to 17.50
Stove Plate and Light Cast Scrap.....	13.50 to 14.00
Agricultural Malleable.....	16.25 to 16.75
Railroad Malleable.....	16.00 to 16.25

Metals.—Copper has been quiet and somewhat easier in tone, business here being largely confined to small lots. Lake is quotable at 11½c. in carload lots and 12½c. to 12½c. in a jobbing way. Pig Lead has continued in good demand and firm at 4.05c. in 500-ton lots, 4.07½c. in carload lots

and 4.10c. in a jobbing way. Sheet Zinc has sold fairly well and the market has continued firm at 6½c. in carload lots and 6.65c. in lots of 600 lbs. Old Metals have been moderately active and steady at previous prices: Heavy Cut Coper, 10½c.; Red Brass, 10½c.; Copper Bottoms, 9½c.; Lead Pipe, 3.90c., and Zinc, 3.85c.

Coke.—The little Eastern Coke that has arrived here during the week has been mainly applied on contracts, the little reaching the open market bringing \$14 to \$14.50 a ton on track. Dealers report considerable confiscation of Coke by railroad companies. It is reported that all agencies of the Frick Coke Company will be discontinued after December 31, 1902. This is regarded as significant. No contracts for Connellsville Coke for next year's delivery are reported, but Virginia Coke is quoted at \$3.50 at the ovens for next year's delivery.

Philadelphia.

FORREST BUILDING, October 28, 1902.

The outlook in the Iron and Steel market is becoming a little more distinct, but it will probably be considerably more so in course of the next two or three weeks. If the elections give a good Republican majority it will doubtless be an element of strength to the business situation, and will for a time at all events revive the courage of those who have been fearing that the period of business prosperity had culminated. In case the election goes the other way a setback of more or less importance can hardly be avoided, but it will then give an opportunity for putting on a bold front, and show what can be done under adverse circumstances. Nevertheless, and apart from all considerations of this kind, a great many adjustments must be made before business can be regarded as in a settled condition. In some lines prices are entirely out of proportion. Costs must be scaled down, and if such a thing is possible prices in some lines ought to be scaled up, but as that cannot be attempted with much chance of success, attention must be directed to decreased costs of production. Steel at \$30 per ton, Steel Bars at \$1.72 per 100 lbs., and similar inequalities cannot be regarded as permanent conditions, so that the question is, Which end will give way first and to what extent? With a general trend toward weakness the natural outcome should be lower prices for raw material, but here again is another difficulty. Transportation is so far below requirements that it will be an impossibility to do more than maintain present supplies, and as these are in a condition of chronic leanness, there is in this direction very little chance for getting prices down. All the coddling that can be done, and all the agreements that may be made to maintain prices prove worthless when supplies are excessive, and conversely when they are inadequate, in which case prices will work higher in spite of all attempts to prevent it. The present situation, therefore, appears to be that the entire market is out of gear, and until adjustments are made it will be impossible to proceed with much confidence. Sales, as a rule, are mostly for small lots to tide over present emergencies, prices in most cases being quite firm, with an upward tendency in Pig Iron, and a little easier in most of the finished products—Plates being an exception. Opinions in regard to the situation are extremely mixed. Some appear to believe that there is not the slightest indication of reaction, others believe that we are already on dangerous ground, but whichever theory may be correct, it is almost impossible to bring either of them to an immediate test. In favor of the first, it may be said that there are no stocks of Iron to depress the market, neither is there any pressure to sell for forward delivery, and when anything is offered it is taken immediately at full prices. This certainly looks like a strong market, but that idea is considerably moderated on a closer examination—why? Because production has been greatly restricted on account of fuel shortage, strikes, &c., and in the meanwhile foreign material has been substituted to cover a very large deficiency, which would have been totally unnecessary under normal conditions. A continuance of business on these lines during the winter months, which is extremely probable, will not by any means be satisfactory evidence of business prosperity. Our home production is not much more than 60 per cent. of what it ought to be, while the cost of doing it has been greatly enhanced. This can hardly be regarded as prosperity, and there is no prospect of betterment until well into the spring months. To add to the difficulties of the situation, the question of transportation begins to look very serious. It was stated one day last week by an official of the Pennsylvania Railroad, that they had at that time 123 miles of cars on the sidings between Philadelphia and Altoona, over 10,000 loaded cars and over 7000 empty cars, with no locomotives available to move them. During the Coal strike the Eastern roads leased some of their locomotives to other roads, but they are now called in, so that worse rather than better conditions are probable during the winter months. Lower prices, therefore, cannot be expected for the present, and foreign material will no doubt be largely used until our normal conditions are restored. It is most unfortunate that a full year of what might have been the most profitable period ever known to the Iron trade has

been virtually stricken out, and it is much to be feared that by the time trade again comes into its legitimate inheritance it will have become greatly impaired.

Pig Iron.—The scarcity of metal for immediate delivery is again very much in evidence. Consumers manage to get enough to keep them going, but between getting Iron and getting Coke they are kept pretty well on the move. Perhaps on the whole prices are a little higher than they were earlier in the month. Foreign Iron is not coming in as freely as it was, many of the vessels having been taken up for coal shipments. Freight is higher, and it is thought that coal has had the preference for quick shipment, and Pig Iron is therefore more or less delayed. So far, however, deliveries have been fairly well maintained, but importers are less sanguine in regard to shipments that should have been made three or four weeks ago. Prices therefore will most likely continue to be very firm, and in case there is any delay in shipments from abroad, higher prices are not at all improbable. Some business has been done for deliveries during the first half of the coming year, and surprisingly high prices have been paid for special Irons. As a rule, however, the market is a trifle slow, offerings for deliveries at any time inside of three or four months being exceedingly small, and for later dates buyers are not urging matters, as there are no bargains in sight at the present time. The coming election is regarded as of considerable importance and until that is out of the way it is not likely that much business will be done. The market is hard to quote with much exactness, but the following are as near as can be given as a fair average for foreign brands alongside ship, cargo lots \$1 to \$1.50 less:

Low Phosphorus.....	\$22.00 to \$22.50
East Coast Bessemer.....	21.50 to 22.00
No. 3 Middlesbro.....	21.00 to 21.50
Scotch, No. 1.....	22.50 to 23.50
Scotch, No. 3.....	21.00 to 21.50
Westphalian, No. 2 Plain.....	20.50 to 21.25

American brands for city or nearby deliveries during the first half of next year may be quoted as follows, and \$1 to \$1.50 more for this year's deliveries:

No. 1 X Foundry.....	\$23.50 to \$24.50
No. 2 X Foundry.....	22.50 to 23.00
No. 2 Plain.....	21.50 to 22.00
Standard Gray Forge.....	20.75 to 21.25
Basic.....	20.50 to 21.00

Billets.—The market is in a transition condition and it is not clear what figures will have to be paid to get Steel. Western Steel is lower, but foreign Steel is still lower than American, although prices are not definitely settled yet. American may range from \$30.50 to \$31.50, delivered; German from \$27.50 to \$28.50, ex-ship, duty paid, but prices on the latter are necessarily governed by the conditions on which it is bought. Importers who have to take all the risks incident to business of that character, must have a fair margin to work on. The first named figure is therefore for lots of several thousand tons each, cash against bills of lading, the latter quotation being for broken lots on the usual American credits.

Plates.—The demand is very good and prices stronger, particularly for short deliveries. The mills have been making rather a small output, owing to the scarcity of fuel and delayed shipments of Pig Iron, but they hope to do better during the coming month. A very large business could be done if mills saw their way clear to accept it, but the disposition is to give the preference to their regular trade, which has been exceedingly good during the past two or three years. The increased capacity of the mills appears to be fully offset by the increased demand from their regular trade. Prices unchanged, but strong, as follows: Small lots, 2.10c. to 2.15c.; carload lots, 1/4-inch and thicker, 2c. to 2.05c.; Universals, 2c. to 2.05c.; Flange, 2.10c. to 2.20c.; Fire Box, 2.25c. to 2.30c.; Marine, 2.30c. to 2.35c.; Charcoal Plates, C. H. No. 1, 2 1/2c.; C. H. No. 1 Flange, 3c.; C. H. No. 1 Flange Fire Box, 3 1/2c.

Structural Material.—There seems to be a gradual catching up on back orders, and while there is no scarcity of business, prices are slowly working toward a lower basis. Special prices are sometimes held at a considerable premium, but in ordinary cases 2c. to 2.25c. appears to be the usual range. On large orders, subject to delivery in 60 or 90 days, 1.75c. to 1.85c. can be done, but all depends on what may be wanted, and when it is wanted.

Bars.—The market is easy and in spots prices are a shade lower, but no official notice of change has been made so far. The understood price for Refined Bars has been 1.92c. as a minimum for carload lots, but that figure has been shaded, and there is reason to believe that 1.85c. to 1.90c. can be done on a nice specification. Steel Bars can be done at 1.75c. to 1.85c., except for large sizes, which are scarce and command special rates.

Old Material.—There is a fair demand, although prices are in some cases a shade lower, but the market has no distinct features either way. The following are the bids and offers for lots delivered in buyers' yards:

Old Steel Rails.....	\$21.50 to \$22.00
Heavy Steel Scrap.....	20.50 to 21.25
Low Phosphorus Scrap.....	26.50 to 27.50

Old Steel Axles.....	25.50 to 26.50
Old Iron Rails.....	24.50 to 25.00
Old Iron Axles.....	30.00 to 31.00
Old Car Wheels.....	19.00 to 20.00
Choice Scrap, R. R. No. 1 Wrought.....	23.50 to 24.50
Country Scrap.....	20.00 to 21.00
Machinery Cast.....	19.50 to 20.00
No. 2 Light Scrap.....	17.00 to 18.00
No. 2 Light (Ordinary).....	14.50 to 15.00
Wrought Turnings.....	16.00 to 16.50
Wrought Turnings, Choice Heavy.....	17.00 to 17.50
Cast Borings.....	10.00 to 10.50
Stove Plate.....	15.00 to 16.00

Imports—For the week ending October 25 are as follows:

	Tons.	Value.
Iron Ore.....	7,904	\$15,559
Ferromanganese.....	286	11,150
Spiegeleisen.....	33	1,324
Pig Iron.....	5,068	82,241
Scrap Steel.....	297	4,463
Steel Rails.....	87	2,765
Steel Bars, Ingots, &c.....	1,848	35,161
Beams, Angles, &c.....	160	3,427
Terne Plates.....	279	14,998

Cincinnati.

FIFTH AND MAIN STS., October 29, 1902.—(By Telegraph.)

The Pig Iron market as seen from this point of view seems featureless. There is but little Iron selling either North or South for nearby or extended deliveries. The demand for quick delivery Irons seems weaker and in some instances offerings are on a lower basis. A week ago the parties who had Southern Iron to offer were asking on the basis of \$23, Birmingham, for No. 2 Foundry; now these same sellers are quoting \$22.50 and meeting with slack response. Gray Forge for prompt shipment is being offered at \$16, Birmingham basis, and getting no buyers. A sale of 1000 tons of Bessemer is reported on the basis of \$23, Hanging Rock. A sale of 5 per cent. Silicon Iron at \$31, f.o.b. Pittsburgh, Pa., is also reported as sold from this point. Perhaps the most important gossip which is current is the report that the conference of Southern interests in New York had decided to make the price for last half of next year on the basis of \$17, Birmingham, for No. 2 Foundry. Whether this turns out true or not it shows the way some thought as to values is tending. The Coke situation is unchanged. Freight rate from the Hanging Rock district is \$1.10, and from Birmingham to Ohio River points \$3.25. We quote, f.o.b. Cincinnati, for 1902 delivery, as follows:

Southern Coke, No. 1.....	\$26.25 to \$26.75
Southern Coke, No. 2.....	25.25 to 25.75
Southern Coke, No. 3.....	24.25 to 24.75
Southern Coke, No. 4.....	22.00 to 23.00
Southern Coke, No. 1 Soft.....	26.25 to 26.75
Southern Coke, No. 2 Soft.....	25.25 to 25.75
Southern Coke, Gray Forge.....	19.25 to 20.25
Southern Coke, Mottled.....	19.25 to 20.25
Ohio Silvery, No. 1.....	30.10 to 32.10
Lake Superior Coke, No. 1.....	26.10 to 26.60
Lake Superior Coke, No. 2.....	25.60 to 26.10
Lake Superior Coke, No. 3.....	25.10 to 25.60

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....	\$28.25 to \$29.25
Lake Superior Car Wheel and Malleable.....	27.50 to 28.50

Quotations for first six months of 1903, f.o.b. Cincinnati, the buyer to assume freight difference which may exist at time of shipment, are as follows:

Southern Coke, No. 1.....	\$22.75 to \$24.00
Southern Coke, No. 2.....	22.25 to 23.25
Southern Coke, No. 3.....	21.75 to 22.75
Southern Coke, No. 4.....	21.25 to 22.75
Southern Coke, Gray Forge.....	21.25 to 22.25
Southern Coke, Mottled.....	21.25 to 22.25
Southern Coke, No. 1 Soft.....	22.75 to 24.00
Southern Coke, No. 2 Soft.....	22.25 to 23.25
Lake Superior Coke, No. 1.....	26.60 to 27.10
Lake Superior Coke, No. 2.....	25.60 to 26.10

In reference to the quotations for 1903 it must be understood that the minimum figures for Southern Irons are applicable to Virginia brands, and the maximum solely to the Tennessee and Alabama product.

Old Material.—The market shows but little change. Cast Scrap is stronger. We quote dealers' buying prices, f.o.b. Cincinnati, as follows: No. 1 Wrought Railroad Scrap, \$21 per net ton; Cast Scrap, \$18 per gross ton; Iron Rails, \$24.50 to \$25, gross; Steel Rails, long, \$24 to \$24.50, gross; Steel Rails, short, \$18.50 to \$19, gross; Iron Axles, \$27.75 to \$28.25, net; Car Wheels, \$21 to \$21.50, gross.

Plates and Bars.—Iron Bars in carload lots, 1.92c., with half extras; same, small lots, 2.20c., full extras; Steel Bars, carload lots, 1.72c., with half extras; same, small lots, 2.20c., full extras. Plates are quoted nominally, 1/4-inch, in carloads, 1.70c.; same, 3-16, 1.80c. As a matter of fact, however, mills having Plates to ship are getting 2.15c. without trouble. I-Beams and Channels, 1.70c., base. All prices f.o.b. Cincinnati.

The Dayton Coal & Iron Company, Limited, have moved their offices to the northwest corner of Third and Walnut streets.

Cleveland.

CLEVELAND, OHIO, October 28, 1902.

Iron Ore.—There has been a sharp conflict during the past week between the shippers and the vessel owners over the carrying rates from the head of Lake Superior. The shippers agreed to an advance from 75c. to 80c., but protested against carrying the rates to 85c. from Duluth to Ohio ports. They backed up their refusal by withdrawing all of their Ore from the market, sending only that material down the lake the movement of which had been provided for on contracts. This produced the desired effect in a measure by throwing the market into some confusion, from which the vessel men rallied in a few days, when they learned that a considerable quantity of Ore still remained at the head of the lakes to come down in wild boats. The market strengthened and then went to pieces, when the United States Steel Corporation announced that 80c. was their limit from Duluth this year, and that in order to retain the prices at that point they intended to keep the boats of the Pittsburgh Steamship Company in service longer than usual. It was at first intended to tie these boats up to the docks after the completion of another trip, but the decision to send them on two extra trips up the lakes has thrown such an unexpected additional supply of tonnage into the market as to completely surprise the vessel interests. The latter class immediately deserted the solid front which they have been showing to the shippers all fall, and some of the individual owners began to take cargoes at the lower rate. With an increasing supply of Coal the market is strengthening some, but it need not be expected to change materially during the remaining portion of the season. November this year is ushered in with the lowest rates prevailing that have ever been paid to vessel interests. The Ore rates of carriage are: Duluth, 80c.; Marquette, 75c.; Escanaba, 60c.

Pig Iron.—Further complications have arisen during the week from the continued shortage of Coke. In fact, it is now said that the week, which has just closed, has been the worst in the history of the present generation of Iron makers for a Coke shortage. Ten of the furnaces in the Mahoning valleys were banked all of last week, and while in some quarters the situation seems slightly improved this week, others are in such a plight that it will be necessary to suspend operations during the present week as well. Prior to that time the shortage of Coke had been so severe and constant that some of the furnaces were about to go on a schedule of three days' idleness and four days of work, but from the present prospect it seems even impossible to maintain such an unsatisfactory schedule as that. The situation is due to the railroad difficulties. The popular wrath against the Coal operators and the railroads owning them, while the Anthracite Coal strike was on, has induced those same individuals and companies, now that operation has been resumed, to cater to the public wish by sending an unlimited supply of equipment into the Anthracite field without regard to the suffering of the other trades. The railroads have said that the welfare of the other interests is entirely subservient to the comfort of the people in the East, who must have Coal. The consequent withdrawal of all of the cars and engines which had been loaned to roads in this territory by those in the East, and the addition to that number of certain equipment which really belongs here have caused such a shortage of transportation facilities that everything is being blocked, the Coke movement among other things. This constantly recurring necessity to bank the fires of the furnaces in the Valleys and elsewhere is, of course, having the most disastrous results upon the supply of Pig Iron. Many of the furnaces which have sold up as close as they dared to their full capacity for the first six months of the year are finding themselves in this position. The sales amounted to half or perhaps three-quarters of their possible output for the first half of next year, and they would consequently have yet to sell anywhere from 1000 to 3000 tons per month on each furnace, and the producers are so far behind with their orders, due to a constant necessity to bank fires, that they will not complete deliveries now on their books before August 1. The furnaces which have any prospects of having any material for sale during the first half of next year other than that already provided for on contracts are very few, and it begins to look now as if even this surplus would be wiped out by other shortages of Coke, which are immediately ahead and that the furnaces already in sore straits because they cannot deliver their material will find themselves even more encumbered. Such a situation, of course, makes it out of the question that there should be any material whatever for delivery during the remainder of this year, and also places the incidental consumer in a position where he must depend upon the foreign markets for his material. This dependence is complete for this year, and there promises to be a season next year when the consumers will likewise find themselves compelled to buy their Pig Iron abroad or go without it. Prices are booming. Foundry No. 1 has been quoted as high as \$28, Valley furnace, while \$25 is absolutely the minimum. Southern No. 2 is now quoted at \$20 as a minimum, Birmingham. Imported Iron prices do not change, despite a marked tendency

in that direction a short time ago. Nova Scotia No. 2 is now bringing \$23.50, delivered, and Scotch No. 1 \$25.50, delivered, with the usual \$1 difference on No. 2. In Basic Iron very little is being done because the Iron is so scarce. The furnaces had sold up their capacity more closely than the foundry furnaces and are feeling the Coke shortage more keenly. It cannot be learned that the consumers are receiving any relief from abroad. The Bessemer furnaces are in about the same plight. Prices have not changed, the nominal quotation of Basic being \$20.50 to \$21, and that of Bessemer for this year and first half of next year's delivery \$23.

Finished Iron and Steel.—Two conditions are noted this week which conflict from two ends of the market. The shortage of Coke for the use of the furnaces brings back the old dread of a scarcity of Bessemer Pig Iron with which to make Steel and accentuates it. The effects of this fear are seen all through the market, especially in the prices demanded by the smaller mills and their unwillingness to take orders at the prevailing prices. On the other hand, one of the most consoling events of the past few months has been the reflective effect of the ending of the Coal strike upon the consumers of material. The ending of the strike has wiped out seemingly all immediate fear of the recurrence of depressed conditions, and buying for next year's delivery has been resumed on a very large scale. Plates have been the leading factor in the trade during the week, and it seems possible that the buying for the first half of next year is not over yet by any means. The larger mills have announced frequently that they have no more material for sale during the first half, which statement has come to be accepted by the consumers, who are going elsewhere for their material. The smaller mills, therefore, are beginning to reap a very rich harvest out of the needs of the consumers by taking large premiums on what they have to sell. The prevailing price is 2c. to 2.10c., at the mill, but in some instances that has been exceeded. There is also a good demand for this Steel for delivery during the current year, and Coke sales are being made regularly. Jobbers have about all of their material sold for some time to come at 2.50c., Cleveland, on both Sheared and Universal Plates. The demand for Sheets does not seem to improve much. There was, of course, a short spurt of sales following the reduction, and the demand since then seems to have been constantly better than it was before, but there is still room for improvement. Prices on Sheets do not change from what they have been, namely: For No. 27 as a base on Black Sheets, 2.85c. to 2.95c. on carload lots at the mill, with store sales ranging from 3.10c. to 3.25c. On the same gauge of Galvanized Sheets the price is 3.70c. to 3.85c. There is a steady demand for 3-16-inch Plates at \$2 a ton over the Plate quotations. Structural Steel has been a steady feature of the market within the last few days, and the buying is now quite heavy. The larger mills have still some uncovered capacity for first half delivery, and while they are not looking for business, are in position to take more if it comes their way. This situation is assuring the consumers that for the time being they are freed from the machinations of the smaller mills, which are hanging off in the interest of premiums. The general feeling abroad is that the big demand for Structural Steel has not started as yet, and that when it does come the mills will be deluged to overflowing. The smaller mills are taking orders now only for the next rolling and refuse to sell ahead. They are making prompt deliveries, therefore, when they do take orders, sometimes sending their material within two or three days from the time the order is closed. On account of the prompt deliveries the smaller mills are having no difficulty in getting 2.50c. or better at the mill, while the jobbers who have any Iron for sale have been able to obtain from 2.50c. to 3c. There is a prospect for a good increase in business soon because more ship orders are coming and other big tonnage is immediately ahead. The Bar Iron situation is not very alluring to the producers. The statements of different mills as to the price vary greatly. Some of them are quoting 1.80c., Youngstown, while the others are holding out for 1.80c., Pittsburgh. From the demand for the material it seems that both are higher than consumers are willing to pay. Sales have been made at both prices, but this trade, in keeping with the other Iron articles, is weak. The mills have fought a decrease in the price because of the almost exorbitant price demanded for Mill Scrap. The price of Bar Steel has been kept strong by the steady demand for it and the market has been in excellent condition. The prospects for future trade also seem brighter now than they have been for a number of weeks past. Bessemer Steel Bars are selling at 1.60c., Pittsburgh, and Open Hearth Steel Bars at 1.70c., Pittsburgh. Billets have about been holding their own this week, at \$30, Pittsburgh, while the shutting out of the foreign material has preserved the home market for the home mills, which are not anxious to dispose of any material, having need for most of it in the production of Finished Steel.

Old Material.—The Scrap market this week has presented a further demand on the part of both mills and foundries for Scrap which the middlemen had some difficulty in filling. The prices are now to the point where if the mills use it they are likely to do so at a loss. The

prices remain unchanged as follows: No. 1 Wrought, \$21, net; Iron Rails, \$27.50, gross; Iron Axles, \$28, net; Cast Borings, \$12, gross; Wrought Turnings, \$16.50, gross; Cast Scrap, \$17.50, gross; Car Wheels, \$19, gross; Heavy Melting Steel, \$19, gross; Old Steel Rails, \$20, gross.

Birmingham.

BIRMINGHAM, ALA., October 26, 1902.

To say that the market is unchanged about expresses the situation. The demand continues as has heretofore been stated for moderate sized and small lots for prompt and nearby delivery, and there is practically no change in prices. It still happens that when a buyer cannot get what he wants he takes what he can get, and the little that is offering finds ready buyers of No. 2 Foundry at \$25, while No. 1 Foundry sold also at \$25. Gray Forge is yet quoted at irregular prices at all the way from \$16 up to \$19. A reliable party though assured your correspondent that some could be had at \$17, but it should be borne in mind that but little of any grade can be had at any price. As to price of Iron for first half 1903 delivery, there is still the same irregularity. It was quoted at \$21, but your correspondent ran upon sales at \$23. The seller who has none to sell generally quotes the lowest. The rate fixed at a meeting in New York last week will be the prevailing rate for awhile anyway for last half of 1903. Some inquiry has been received and some sales have been reported, but your correspondent has failed to confirm them so far.

Some mention was made in the last letter of the importation of Scotch Iron. The greater part of this lot has been placed, but the ruling price is withheld. It is safe to say that it was less than the price of domestic Iron. The importation of further lots is a matter of conjecture. So far as the prospects here are concerned there is little danger of our make getting in the way of its sale for some time to come, as deliveries on old business are still greatly belated and will be for months.

The banking of several furnaces during the recent strike lowered our production, which had been far below maximum capacity. But we are about back to where we were when that untoward event occurred, and the prospects for a steady continuance of production seem at the present to be very good. The belief has deepened into a strong conviction that before we can get best results all the means for making Iron must be modernized. With that idea in view the Tennessee Company have under consideration the erection of two or three modern furnaces of large size in addition to what they already have in blast, so that the total capacity will be sufficient to absorb their Coal and Coke output. It is a noticeable fact that in all the improvements being made the principals are sticklers for the latest improvements. It is reported that the Republic Company contemplate and are preparing to renovate their property here to attain greatest results. It is whispered that another company is being formed to build a furnace plant. The names of some of the members include those who have been and some who are yet active in the Iron world.

The Williamson Furnace was blown in the past week and had a successful opening. The company operating it will be regularly in the market as sellers of Iron. But the capacity is limited, being only 80 to 85 tons.

The construction force on the Seaboard Air Line Railroad have commenced operations between Irondale and Coal City, and the work will be pushed as rapidly as possible. They are inviting bids for the grading of their yards in the city extending from Twenty-fourth to Thirty-second streets. But it will be a year before we derive any benefit from it. The Belt Line have executed a mortgage for \$1,000,000 to an Eastern company, and will place that important auxiliary in first-class shape. When the Electric Railway completes the work it is doing in the way of improvements and extensions now under way it will have expended \$2,500,000. It is about concluding the installation of an additional 10,000 horse-power capacity to its outfit, the work being done here.

Our labor troubles seem to be coming to a head, as injunctions have been secured by several foundry firms against the malcontents, restraining them from interfering with their property or business. The laws of this State are very strict on this subject. Their issuance has had a very quieting effect. The machinists' strike has about petered out. They have only worked to the injury of both employer and employee, and have greatly cut into the manufacturing profit, and caused much business to be diverted from us, besides planting the seeds of distrust between employer and employee. The various shops report comparatively little new business, not because it was not tendered, but because they were afraid to take it. In some cases barracks had to be improvised and the workmen housed and fed by employers to protect them from assault and outrage.

The situation in Coke is unchanged, and sales vary all the way from \$7 to \$7.75. It is eagerly taken at these prices. The outlook is poor for much improvement in the near future. In Coal the situation is strong, and the de-

mand is beyond supply. This is in part owing to the scarcity of cars for which there is a never ceasing demand.

Iron Ore is unchanged, with Red running from 85c. to \$1.25, and Brown Ore \$1.50 to \$1.75. The lower figures prevail only where contracts exist.

The establishment of a large trust and savings bank is announced, in which local and Eastern capital will figure. One feature of it will be the declination of the usual commercial business and paper. It will have a large capital.

The Central Coal & Iron Company, at Tuscaloosa, are establishing at their mines in Tuscaloosa County a pneumatic plant for their working, and others will follow their example as soon as circumstances permit. The scarcity of labor is forcing the adoption of all labor saving appliances in production. Among the important contracts under way can be mentioned one large pumping engine for the Tennessee Company, whose capacity will be 6,000,000 gallons. The Hardie-Tynes Company will build it.

Our Athletic Club has broken ground for a new building to cost over \$40,000 and to be one of the finest fitted buildings in the South. Articles of incorporation have been filed for another ice company, to be capitalized at \$100,000, and papers of incorporation were taken out for a large livery stable, the company being capitalized at \$40,000. Five carloads of boilers have been shipped from Indianapolis to be used in the mines now being opened by the Alabama Steel & Wire Company, near Bessemer, and more are to follow.

Structural Material for our second sky scraper has been arriving of late and is being rapidly placed in position. In a short time and just as soon as arrangements can be made for delivery of material work will commence on the third one. Everywhere you go in the district you are greeted with the sound of the saw and the hammer, and every day adds to what has already been done. Sufficient contracts have already been let to insure an active winter, and more are being matured that will carry us forward another year.

St. Louis.

CHEMICAL BUILDING, October 29, 1902.—(By Telegraph.)

Pig Iron.—Changes of any particular note are lacking in the Pig Iron situation at this point. Shipments are not coming forward any freer, although it is said the furnace situation in the matter of production is improving, but the railway facilities are not adequate for prompt movement of the product. Spot Iron in small lots is in demand, but larger requirements seem to be pretty well covered for the first half. We quote, f.o.b. St. Louis as follows:

Southern, No. 1 Foundry.....	\$24.25 to \$28.75
Southern, No. 2 Foundry.....	23.75 to 27.75
Southern, No. 3 Foundry.....	23.25 to 26.25
Southern, No. 4 Foundry.....	22.75 to 25.75
No. 1 Soft.....	24.25 to 26.25
No. 2 Soft.....	23.75 to 25.75
Gray Forge.....	22.75 to 24.75
Southern Car Wheel Iron.....	to
Malleable Bessemer.....	to
Ohio Silvery, 8 per cent. Silicon.....	to
Ohio Strong Softeners, No. 1.....	to
Ohio Strong Softeners, No. 2.....	to

Bars.—The trade for Bars reported by the mill representatives at this point is said to be on an active and increasing scale. Bookings for next year's delivery show up very well, and negotiations of a number of substantial requirements are pending. Jobbers continue to report a very good volume of trade from their stores. We quote from the mills: Iron Bars at 1.90c. to 1.95c., and Steel Bars at 1.80c. to 1.90c. Jobbers quote Iron Bars at 2.25c., and Steel Bars at 2.25c.

Rail and Track Supplies.—The report from this department of the market is very favorable, and the volume of business being negotiated from day to day for 1903 delivery is large. No important changes in the general situation and prices. We quote as follows: Splice Bars at 2.10c.; Bolts, with Square Nuts, at 3c. to 3.10c.; Hexagon Nuts, 3.25c. to 3.30c., and Spikes at 6.60c. to 6.75c.

Angles and Channels.—The store trade coming to the jobbers in Small Angles and Channels is in very fair volume and new inquiry continues to show improvement. For material of this class 2.50c., base, is asked from store.

Pig Lead.—The market for Pig Lead continues to show steadiness, and the price-list shows but slight variation from day to day. We continue to quote Chemical at 4c. to 4.02½c., and Desilverized at 4.02½c. to 4.05c.

Zinc.—Activity in the Spelter market is not very pronounced just at this time, but the market seems to be in good strong shape with prospects of renewed activity. We quote 5.20c. bid and 5.25c. asked.

C. A. Stevenson Pig Iron & Coke Company, Commonwealth Trust Building, have been appointed exclusive selling agents in St. Louis and Western Territory of the La Follette Coal, Iron & Railway Company, makers of Pig Iron, at La Follette, Tenn.

French Iron Market.

PARIS, October 7, 1902.

The general situation is not brilliant, the Iron trade complaining quite generally of the prices of fuel, and claiming a good part of the responsibility for the present prices is due to the attitude of the collieries. It is remarked, however, that some of the leading merchants are coming forward with inquiries. For some time past they have been taking a pretty large tonnage, but do not close business until after prolonged negotiations. Home consumption is declining more and more, and our rolling mills and foundries must either cut down production or must endeavor to find new markets abroad. The statistics of our commerce show much that is significant in this respect. Thus during the first eight months of the present year we have exported 136,500 tons of Pig Iron as compared with only 54,800 tons during the corresponding period of 1901.

In finished Iron products the figures are respectively 33,300 and 25,200 tons, while for finished Steel the exports have been 78,000 tons during the first eight months of 1902 as compared with 30,000 tons during the first eight months of 1901.

For the first eight months of 1901 and 1902 the imports have shown a decline. Thus in Pig Iron they fell off from 43,000 to 26,500 tons. In finished Iron products from 26,000 to 17,700 tons, and in finished Steel from 6500 to 3600 tons.

The following table shows the imports and exports under the drawback system for the first eight months of the year:

	Temporary Imports, eight months.		Re-exports, eight months.	
	1902. Tons.	1901. Tons.	1902. Tons.	1901. Tons.
Pig Iron.....	53,263	61,622	55,332	59,178
Finished Iron.....	4,114	6,079	6,778	4,379
Plates.....	1,375	1,781	1,880	1,856
Finished Steel.....	1,595	1,042	2,366	861

A question which at this time is engaging the interest of the French Iron industry is the study of the new Iron Ore deposits in the district of Briey, Muerthe-et-Moselle. According to the most recent analysis it appears that this new district contains a deposit of Iron Ore superior to any other known in Europe, and the French Iron trade would through these new deposits be assured of a supply of Ore for several centuries.

But unfortunately Ore deposits do not suffice for the manufacture of Pig Iron and its products. Coal and Coke are necessary, and from this point of view the new region is unfortunately placed since it must draw either upon the north from the Pas de Calais district, from Belgium or from Westphalia.

Coke must, therefore, traverse several hundred kilometers in order to reach the furnaces. It must bear the cost of transportation and duties, which in certain instances amount to more than the cost at the initial point. No one will doubt that if the works of the Muerthe-et-Moselle district had fuel close by, the development of the Iron industry of the district would proceed at an extraordinary rate. All other industries would be gainers, and new ones would be created in this region.

For a long time the question has been agitated whether there was not a chance to secure coal in this district. Numerous borings have been carried out between Forbach Faulquemont and Rouley. The point has been raised that the Saarbruecken Basin may extend into the Muerthe-et-Moselle department. This search has led to the following conclusions: The coal if it could be found would be at a very great depth, yet it is possible that success might crown these efforts.

Returning to the market situation, we note that the Steel works and the rolling mills generally lack regular and assured work. No official lowering in prices has been made, but concessions are openly accorded.

The construction shops are somewhat better supplied with new work for the navy and the railroads. The boiler works are a little more actively employed, and some important orders are in sight. Foundries are less favored, and orders have become pretty scarce so that a number of the works are idle during a part of every week.

The public foundries continue to complain of the situation, which is rendered difficult by the slight consumption at home. Those whose cost is too high to allow them to export are cutting down their production. Others better equipped and better situated are selling for export. This situation is partly due to the enormous development of electric lighting, so that the gas works are not extending their territory to any extent.

The Pipe industry had a period of prosperity when there were few foundries manufacturing Cast Iron Pipe, and when all the large towns were extending their systems. However, this prosperity in itself led to the erection of foundries, and while production was increasing consumption was declining, the large centers of population having established their net work of Pipe lines.

Pittsburgh.

(By Telegraph.)

PARK BUILDING, October 29, 1902.

Pig Iron.—The Pig Iron market has reached the condition that it is not a question of price, but where to find any Iron for sale. Twenty-three dollars at Valley furnaces has been offered for Bessemer Iron for November and December shipment, while offers of \$21 at furnace for Bessemer Iron for first six months of next year have been turned down. The situation has been aggravated by the difficulty that furnacemen are having in placing contracts for Coke. While the leading Coke interest has announced that its price for Furnace Coke for next year will be \$3 a ton, yet it is understood that owing to larger demands of identified interests the Frick Coke Company will not be able to furnish Coke to a number of furnaces that they have heretofore supplied, and other sources will have to be looked to, which perhaps may not be able to furnish the Coke. It is claimed that offers of \$4 for Furnace Coke for next year have been refused until the situation becomes clearer. In fact, it is commencing to look a good deal as though there will not be Coke enough to go around. It is not unlikely that it will be the policy of the Coke interest to take care of constituent companies before giving Coke to outside parties. A number of deals have been made in the past week for Coal lands in the Connellsville region and some very fancy prices are being paid for Coking Coal properties. We quote Bessemer Pig Iron for delivery this year at \$23 to \$23.50, maker's furnace. For next year's delivery \$21 or better would probably be paid. The fact that the leading Coke interests have fixed prices for next year's Coke will probably open up again the deal for the purchase by the United States Steel Corporation of a large block of Bessemer Iron from the Bessemer Furnace Association, for delivery all through next year, commencing April. The quantity will not be less than 200,000 tons and it may be 300,000 tons or more. The Pig Iron situation as it now exists indicates a large shortage of metal through the winter months, and for this reason heavy importations of German Iron are not unlikely. We quote Forge Iron for delivery this year at \$21.50 to \$21.75, but note that there is very little demand. For next year's delivery contracts for Forge Iron have been made at \$21 at furnace, equal to \$21.75, Pittsburgh. No. 2 Foundry Iron for delivery next year is held at \$21.50 to \$22 at maker's furnaces.

Steel.—The Steel market is somewhat quiet, buyers holding off in anticipation of lower prices. However, we can state that the Steel market is stronger than for some time, partly due to the fact that no foreign Steel whatever is being offered. No decision has yet been reached in regard to the import duty. We quote Bessemer Billets at \$29.50 to \$30, and Open Hearth at \$32 to \$35, depending on carbons. Sheet Bars, for which there not much demand, are held at \$30 to \$31, maker's mill.

Sheets.—A slightly better demand for Sheets is reported, and specifications on old contracts are said to be coming in more freely than for some time. It is not believed that there will be any further reduction in price of Sheets, and for this reason a better buying movement is anticipated.

Ferromanganese.—We note the sale of a lot of German Ferro at \$52, Pittsburgh.

(By Mail.)

The two principal items of interest in the Iron trade this week are the settlement of the wage reduction on export Tin Plate and the announcement by the leading Coke interest that the price of Blast Furnace Coke for next year shipment will be \$3 a ton. Full details of the Tin Plate settlement are given elsewhere in this issue. In regard to the Coke situation we can state that commencing January 1, 1903, the H. C. Frick Coke Company will handle the product of the mines and ovens of the United States Steel Corporation only. The output of the several Coke producers in the Connellsville region, which the Frick Coke Company have been handling in the past, aggregating 75,000 to 90,000 tons per month, will be marketed after this year by the producers themselves, or through some other channel. Because of the inability of the railroads entering the Coke region to furnish full and satisfactory transportation it can be stated that the H. C. Frick Coke Company will not take any contracts for Foundry or Crushed Coke for 1903 delivery. This is a radical departure on the part of this concern and has been brought about solely by the existing poor transportation facilities. The fact that the Frick Coke Company have made a price on Furnace Coke for next year indicates that it will be the policy of that concern to market their surplus Coke in the future as they have in the past. It is understood that the amount of Coke thus marketed, however, will be much less next year than heretofore, for the reason that early next year four new blast furnaces now under construction, two at Bessemer, one at Rankin and one at Mingo Junction, will be completed, and these four furnaces will take upward of 1,000,000 tons of Coke, all of which will be supplied by the H. C. Frick Coke Company.

This amount of Coke will therefore be taken out of the general market. It was the expectation of the Frick Coke Company to have at least 600 new ovens in the Pocahontas region completed by January 1 next, but owing to delay in receiving equipment and also by the railroads in delivering materials, it will probably be April or later before any ovens have been completed in this region. The action of the leading interest in putting the price of Furnace Coke at \$3 a ton will no doubt be generally commended by the trade as carrying out the announced conservative policy of the United States Steel Corporation. In view of the present high prices of Pig Iron and the outlook that these high prices will be maintained all through the coming year, \$3 a ton for Coke is certainly a conservative price. Aside from the above there is nothing of special interest to be noted in the Iron trade this week. The amount of tonnage that is being placed is fairly satisfactory, but is not so heavy as in the early part of the year and in the summer months. It is believed, however, that the settlement of the Tin Plate scale, the fixing of the price for Furnace Coke and the reduction in prices on Sheets and Wire products, will give the market a stability that it has not had for some time and that a better buying movement will be the result. None of the mills are in distress for tonnage, aside from Tin Plate, Sheets and Wire products, and it is believed demand for these products will soon show a material increase. In regard to the outlook for 1903, it may be stated that it is entirely satisfactory to the leading interests and it is believed next year will prove to be one of the best years the Iron trade has ever had.

Muck Bar.—The market is very quiet, there being practically no buyers and prices are weak. We quote local makes of Muck Bar at \$35.50 to \$36, delivered Pittsburgh, but note that Eastern Bar is being offered at \$34 or lower, delivered in this market. A local consumer has recently bought a round tonnage of Eastern Muck Bar at about the above price.

Spelter.—Prompt Spelter is still very difficult to obtain, and is held at about 5.33½¢, Pittsburgh. Futures are held at about 5.27¢, and we note a sale of 150 tons of Prime Western Spelter for future delivery at that price.

Structural Material.—A very heavy tonnage continues to be placed and a great deal of work is in sight. The Pennsylvania Railroad will place contracts in a few days for bridge work involving about 20,000 tons. Other Eastern roads are in the market for a large tonnage. A good many local jobs are being placed, taking anywhere from 300 to 1000 tons each. None of the Structural mills are in position to make deliveries inside of three or four months, while the leading interest is reported to be sold up solid for first half of next year. Shipments continue to be much retarded by lack of railroad facilities and scarcity of fuel is causing a great deal of inconvenience at the different works. An item of interest in the Structural trade is that the Carnegie Steel Company will probably build a very large Angle mill at Howard. Prompt Beams and Channels continue to bring 2½¢ to 3¢ a lb. and higher. Building construction of all kinds is being greatly retarded by difficulty in securing deliveries of material. Official prices, which applied only on indefinite delivery of Structural Shapes, are as follows: Beams and Channels, up to 15-inch, 1.60¢; over 15-inch, 1.70¢; Angles, 3 x 2 up to 6 x 6 inch, 1.60¢; Zees, 1.60¢; Tees, 1.65¢; Steel Bars, 1.60¢, half extras, at mill; Universal and Sheared Plates, 1.60¢ to 1.85¢.

Plates.—The market continues extremely active, and mills that can make deliveries of Plates within two or three months are getting from 1.85¢ to 2¢, at mill. The minimum price of a local mill is 1.85¢ for deliveries within three or four months. It looks as though there would be a famine in the Plate trade, all the mills being heavily sold up and tonnage is still coming in at a very heavy rate. It is reported that 25,000 to 30,000 tons have been placed by boat builders within the past two weeks for deliveries running over six months of next year. Several large lots of Plates for shipment this year have been sold at 2¢, Pittsburgh, and even higher prices are reported. Official prices, which apply only on indefinite deliveries of Plates, are as follows: Tank Plate, ¼-inch thick and up to 100 inches in width, 1.60¢, at mill, Pittsburgh; Flange and Boiler Steel, 1.70¢; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80¢; Still Bottom Steel, 1.90¢; Locomotive Fire Box, not less than 2.10¢, and it ranges in price to 3¢. Plate more than 100 inches wide, 5¢ extra per 100 lbs. Plate 3-16 inch in thickness, \$2 extra; gauges Nos. 7 and 8, \$3 extra; No. 9, \$5 extra. These quotations are based on carload lots, with 5¢ extra for less than carload lots; terms, net cash in 30 days.

Hoops and Bands.—A material improvement in tonnage is reported, and we are advised that official prices are being firmly held. We quote Hoops at 1.90¢ for 250-ton lots and over and 2¢ in carloads. Bands are 1.90¢ for Bessemer stock, 12-gauge and heavier, while for Open Hearth stock \$2 per ton advance is charged.

Ferromanganese.—We continue to quote German Ferro at \$51.25 to \$51.50, and English at \$52.50, Pittsburgh, in large lots. There is not much doing, as leading consumers

are covered for a long period ahead. Small lots of foreign Ferro bring \$54 to \$55, Pittsburgh. No domestic is being offered.

Bars.—A fair amount of new tonnage in Bars is being placed, and while the mills could probably handle a larger business, yet none of the makers are badly in need of orders. Tonnage being placed at the present time is confined mostly to immediate requirements. Specifications on old contracts are coming in in a fairly satisfactory manner. We quote Steel Bars at 1.60¢, at mill. All specifications for less than 2000 lbs. of a size subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10¢ per lb. extra. Quantities less than 1000 lbs., 0.30¢ per lb. extra, the total weight of a size to determine the extra regardless of length. We quote Iron Bars at 1.80¢ to 1.85¢ in carloads and 1.90¢ in small lots, f.o.b. Pittsburgh, half extras as per National card.

Rods.—The market continues quiet, but prices are fairly firm. We quote Bessemer Rods at \$36 and Open Hearth at \$37, Pittsburgh. On an attractive order it is possible these prices would be slightly shaded.

Sheets.—A fair amount of tonnage is being placed, but the mills could take care of a very much larger business if it was being offered. It is claimed the recent reduction in price of Sheets has not helped demand to any great extent. Shipments from the mills continue to be very much retarded by the lack of cars and motive power. The mills are also hampered by reason of lack of fuel, and a number of plants have been idle recently for one or two days at a time, waiting for fuel to arrive. For 500-bundle lots and over we quote No. 27 Black Sheets, box annealed, one pass through cold rolls, at 2.65¢, and No. 28 at 2.75¢. For carload lots No. 27 is held at 2.70¢ and No. 28 at 2.80¢. Jobbers charge the usual advances for small lots from store. We quote Galvanized Sheets, No. 27 Gauge, at 3.60¢, or 75 and 10 per cent. off list, and No. 28 at 3.85¢, or about 75 and 10 off list. All above prices are f.o.b. at mill. Shipments of Sheets from the different mills are being very much retarded by lack of cars and motive power, and one leading interest advise us that their shipping department was shut down recently for one whole day awaiting cars.

Merchant Steel.—Demand for Crucible Steel is fairly heavy and some good sized orders are also being placed for Machinery Steel. The mills are pretty comfortably filled, but there is a good deal of new competition and concessions in prices are frequent. We quote: Tire, 2.15¢ to 2.25¢; Spring, 2.25¢ to 2.35¢; Toe Calk, 2.30¢ to 2.40¢; base; Sleigh Shoe, 2.15¢ to 2.25¢. Differentials are as follows: Less than 2000 lbs. of a size and not less than 1000 lbs., 10¢ advance; less than 1000 lbs. of a size, 30¢ advance; Cold Rolled Shafting is 47 per cent. off in carloads and 42 per cent. in less than carloads delivered in territory east of the Mississippi and north of the Ohio rivers. Tool Steel is 6½¢ to 10¢ for ordinary grades and 12¢ and upward for special grades.

Merchant Pipe.—The change in discounts in Iron Boiler Tubes announced last week, instead of being a reduction, was an advance of about 5 per cent. The error occurred through telephonic transmission. It is probable that the keen competition of outside mills will force the leading interest to revise discounts on the smaller sizes of Merchant Pipe before long and put them on a lower basis. The trade have this steadily in mind and purchases of Pipe ranging in size from ½ to 4 inch are mostly in small lots, jobbers being desirous of having as light stocks as possible in view of the probable reduction in prices which seems imperative. As yet no announcement has come from the National Tube Company of any change in prices. Discounts on carload lots on which an extra 10 per cent., and occasionally a heavier discount, is allowed are as follows:

Merchant Pipe.	Black.	Galvd.
½ to 1½ inch, inclusive.....	60	48
¾ to 12 inch, inclusive.....	67	55

Boiler Tubes.—The announcement last week by the National Tube Company of an advance of about 5 per cent. on Iron Boiler Tubes was a surprise to the trade. These new discounts for carload lots are as follows:

Iron Boiler Tubes.	
1 to 1½ inches and 6 to 13 inches.....	36¼ %
2½ to 3 inches.....	45¼ %
1¾ to 2½ inches.....	35 %

Skelp.—There is practically no demand and the market is very weak. We quote Grooved Iron Skelp at 1.95¢ to 1.97½¢ and Sheared at 2.05¢ to 2.10¢, delivered Pittsburgh.

Coke.—The announcement that the leading Coke interest have fixed the price of Blast Furnace Coke for all of next year delivery at \$3 a ton is fully referred to in the opening of this report. It is a fact, however, that contracts for Furnace Coke have been made for next year delivery at \$3.50 to \$4 a ton. The car and motive power situation is about as bad as it possibly could be, and it is said that less Coke is being shipped now than at this time last year, in spite of the present heavy demand. Furnaces are running from hand to mouth on Coke supply, and every day from three or four to eight or ten stacks are banked, waiting for fuel. Prompt Coke continues to command anywhere from

\$8 to \$10 and \$12 a ton. The output of Coke last week in the upper and lower Connellsville regions was over 300,000 tons, and shipments show a falling off of nearly 1000 cars over the previous week. Contracts for Foundry Coke for shipment in first six months of next year are being made at \$4.50 to \$5 a ton.

New York.

NEW YORK, October 29, 1902.

Pig Iron.—The demand for prompt delivery has fallen off somewhat, buyers expecting that shipments on old contracts from the furnaces affected by the Anthracite Coal strike will be more liberal. Foreign Iron is being offered to a moderate extent. The room on the regular lines by which the mass of small parcels is handled is pretty well taken up to the end of the year. The leading Southern makers, including the Tennessee, Sloss-Sheffield, Republic, Virginia and Allegheny and Low Moor companies, have decided to name prices on the basis of \$20 per ton for No. 2 Birmingham, for delivery during the second half of 1903. We understand that some small sales at this price have been consummated. For delivery in the first half of 1903 the following quotations are made: Northern Iron, at tidewater, No. 1 X, \$23.75 to \$24.75; No. 2 X, \$22.50 to \$22.75; No. 2 Plain, \$21.50 to \$21.75. Tennessee and Alabama brands, in New York and vicinity: No. 1 Foundry, \$24 to \$24.50; No. 2 Foundry, \$23.50 to \$24; No. 3 Foundry, \$22 to \$22.50.

Steel Rails.—While some of the Eastern mills are known to be far behind in their deliveries, the Western mills are turning out a heavy tonnage, in some cases considerably above that expected. Still a certain demand for prompt delivery cannot be filled and some of it may go to foreign mills, whose prices have weakened somewhat lately. On the other hand, the financing of some extensive trolley lines has not proceeded satisfactorily during the money squeeze and the builders have asked that deliveries be delayed. We continue to quote \$28 at Eastern mill.

Cast Iron Pipe.—The trade look with some interest for developments at Philadelphia, reports being current that bids for a large quantity of Pipe will shortly be asked for. The demand for small lots keeps up very well. Prices, tide-water delivery, are as follows: 6 and 8 inch, \$36; 12-inch, \$36.50; larger sizes, \$35.75, gross ton.

Finished Iron and Steel.—The event of the week is the placing of large orders for bridge work by the Pennsylvania Railroad Company. Instead of 18,000 tons, on which bids were invited from various bridge companies, the railroad company placed orders aggregating 31,000 tons, divided among a number of works, all for early delivery, not to extend beyond six months. This was wholly unexpected, but it shows that it is not impossible to secure fairly good deliveries of bridge material, despite the reports that the works are all crowded with orders. Business in other directions is reported excellent by the bridge companies. The outlook for the Structural trade in the building line is not so rosy as it has been. Builders and contractors are beginning to feel that prices are likely to sag and are holding off. They are also influenced by the high cost of labor and the possibility of an advance being asked by the Structural Steel workers. We quote, at tidewater, as follows, but for small lots and prompt delivery much higher prices are being obtained for Structural Material and for Plates: Beams, Channels and Zees, 2c. to 2.25c.; Angles, 2c. to 2.25c.; Tees, 2c. to 2.25c.; Bulb Angles and Deck Beams, 2.10c. to 2.25c. Sheared Steel Plates are 2.10c. for Tank, 2.20c. for Flange, 2.35c. to 2.40c. for Fire Box. Refined Bars are 1.95c. to 2c.; Soft Steel Bars, 1.95c. to 2.10c. Foreign Beams are 1.80c. and Angles 1.90c., ex-ship, New York, in 500-ton lots or greater.

Old Material.—The Eastern demand continues light and prices are nominal, except on Wrought Scrap, which for some reason displays a tendency to advance. Selling quotations are as follows, per gross ton, f.o.b. cars in this vicinity:

Old Iron Rails.....	\$22.00 to \$23.50
Old Steel Rails, long lengths.....	22.00 to 23.00
Old Steel Rails, short pieces.....	19.00 to 19.50
Relaying Rails, heavy sections.....	29.00 to 30.00
Relaying Rails, lighter sections.....	34.00 to 35.00
Old Car Wheels.....	20.00 to 20.50
Old Iron Car Axles.....	27.00 to 28.00
Old Steel Car Axles.....	25.00 to 26.00
Heavy Melting Steel Scrap.....	19.00 to 19.50
No. 1 Railroad Wrought Scrap Iron.....	22.00 to 23.00
Track Scrap.....	20.00 to 21.00
Busheling Scrap.....	15.00 to 16.00
No. 1 Machinery Cast Scrap.....	19.00 to 20.00
Stove Plate.....	13.00 to 14.00
Wrought Turnings, delivered at mill.....	16.50 to 17.50
Cast Borings, delivered at mill.....	10.00 to 10.50

The Sheffield Coal & Iron Company, who purchased the three furnaces at Sheffield, Ala., from the Tennessee Coal, Iron & Railroad Company, have appointed Rogers, Brown & Co. sole selling agents. In purchasing the plant no orders for Pig Iron were assumed by the Sheffield Coal & Iron Company, and they are therefore in position to take orders for immediate delivery, as well as for the future.

Metal Market.

NEW YORK, October 29, 1902.

Pig Tin.—While there has been little business on consumptive account prices have been advanced steadily during the last few days. The market has been quiet throughout the week, as consumers are buying from hand to mouth. The upward movement was started with advancing the price of spot to 26.35c., from which point it has made steady gain, the closing market to-day quoting spot 26.75c. to 27¼. November delivery was quoted 26.45c. to 26.55c. The London market opened up at £119 2s. 6d. for spot, and closed to-day at £120 12s. 6d. for spot and £119 10s. for futures. Arrivals so far this month aggregate 2188 tons, which figures doubtless represent the entire month's arrivals, as no more of the metal is expected during the balance of this week. A large portion of the 2188 tons are still on ship-board, and it has been necessary to draw considerably from warehouses. It is said that the statistics for the month will show fair deliveries.

Copper.—The market is extremely dull with prices slowly receding. Demand for home consumption is small and that for export is still smaller proportionately. In Europe it is reported that American houses are offering freely at figures considerably lower than those quoted here. At the close to-day the market was as follows for delivery spot to December: Lake, 11.75c. to 11.95c.; Electrolytic and Casting, 11.60c. to 11.70c.; Standard, nominally 11c. The London market declined steadily, closing £52 1s. 3d. for spot and £52 5s. for futures. Best Selected has made a net decline of 5 shillings during the week, the present quotation being £56.

Pig Lead.—The market is devoid of an interesting feature with the exception of the consolidation of the large consumers. In this connection there is nothing new, as the National Lead Company have not as yet issued the promised statement showing the details of the merger. The official price is still 4.12½c. for Desilverized, spot, and 4.10c., futures. London is unchanged, at £10 15s.

Spelter.—The fire referred to in our last issue destroyed four of the five furnace buildings of the Edgar Zinc Company, at Cherryvale, Kan. This will necessarily cripple the works for a time, but the company have purchased sufficient metal of other brands to protect their customers on orders placed prior to the fire. This was done before the news of the fire became known, and consequently there was no unfavorable effect felt in the market. The market for the metal has become a little easier and is quiet. The price of spot has declined here to 5.40c. to 5.45c. The St. Louis market quotes 5.20c. to 5.22½c. London is unchanged, at £19 5s.

Antimony.—Is unchanged. Hallett's is quoted 7¼c., Cookson's 9½c., and other brands 7¼c. to 7½c.

Nickel.—No change is noted. Large quantities down to ton lots are now quoted at 40c. to 47c. per lb., according to size and terms of order. Smaller lots are quoted as high as 60c., according to quantity.

Quicksilver.—The market is quiet and unchanged, the ruling quotations being \$48 per flask of 76½ lbs., each in lots of 50 flasks or more. London is unchanged at £8 15s.

Tin Plates.—While no official cut in prices has been made as yet every indication points to considerably lower prices ruling for the next quarter or such period after December 1 as may be decided upon by the American Tin Plate Company. It is expected in the trade that the new price will be announced on November 1 or surely within the coming week. The present official price of \$4.19 per box of Standard 100-lb. Cokes holds only until December 1. The unsettled state of trade in this article has been intensified by the acceptance of the workmen of a general reduction of 3 per cent. in wages on all Tin Plate instead of a specific cut of 25 per cent. on export Plates. Word now comes to the effect that the Welsh Tin Plate trade have decided to retaliate, and that the Welsh workmen will also stand a reduction in wages in order to maintain the business which they are now getting and which will perhaps help them in even greater competition with American makers. It is quite natural that under present conditions consumers are holding off to see what will happen. Even the independent product which has been somewhat lower in price than that of the American Tin Plate Company is not now finding purchasers.

Reports in the daily press that the Jones & Laughlin Steel Company of Pittsburgh had purchased 1000 acres of land at Girard, Pa., to be used as iron ore docks and terminal facilities of the proposed new ore road to Pittsburgh, have been officially denied. No such purchase has been made.

The Ashland Iron & Mining Company, Ashland, Ky., are considering the question of building another blast furnace, but nothing definite has been decided upon, and probably will not be for some time.

Cleveland Machinery Market.

CLEVELAND, OHIO, October 27, 1902.

A number of the Cleveland machinery dealers and manufacturers experienced a falling off in business during the latter part of September, and the early part of this month, due to the tight money market, combined with the uncertainty consequent with the coal strike, but these conditions have passed and business in general is about up to, and in some cases better than that of the corresponding months last year. To say that every concern in this district has about all it can take care of truthfully covers the situation. There are numerous complaints that it is impossible to secure sufficient help of all classes, particularly skilled machinists. Numerous concerns employing union men have applied to the district headquarters of the Machinists' Union, but that organization has been unable to help matters. In the face of this almost unparalleled condition comes the news that this week there is to be held in this city a meeting of the heads of the Machinists' Union, to consider ways and means to enforce the nine-hour system in all the shops of the city. It is stated that at present only about one-third of the Cleveland factories are so-called nine-hour shops, and the majority of these shops are paying for 54 hours' work per week, which are put in as the men prefer.

President W. L. Brown of the American Shipbuilding Company reports a marked improvement in the deliveries of material needed by the various plants of the company. At present the company are about 60 days behind their expectations, owing to delays in material which can be traced back to the anthracite strike, but in event of prompt deliveries during the balance of the season the company expect to complete their vessel contracts almost on time. In view of this improved condition, it is quite probable that other vessel contracts will be closed within the next few weeks.

The automobile industry is developing at an astonishing rate in this city and vicinity, and new concerns are constantly being heard from. They are particularly active at this time, many concerns which have been experimenting having completed satisfactory productions, and are now getting ready to manufacture machines in large quantities for another season. Quite naturally machinery salesmen are following these concerns very closely, and they are securing some very good orders.

The Winton Motor Carriage Company are now settled in their new plant, which is said to be the largest of its kind in the world. It covers about 5 acres, facing over 1700 feet on the main line of the Lake Shore & Michigan Southern Railway, 5 miles west of the center of the city. The machine and erecting shop is 100 x 300 feet, about one-half devoted to machine tools. Much new equipment has recently been purchased and other orders are being placed. Among the tools recently installed are: Two Becker-Brainard vertical millers, a Gisholt chucking lathe, a Lucas Machine Company's horizontal boring mill, eight Bardons & Oliver screw machines, three Brown & Sharpe automatic gear cutters, four Dreses, Mueller & Co.'s radial drill presses and a Landis Tool Company's grinder. The Winton Company will shortly employ 700 men, and expect to turn out 1000 high priced automobiles the coming season.

The Star Automobile Company have been organized by J. H. Van Dorn, E. I. Leighton, W. A. Dutton and Frank Schneider, all of whom are interested in the well-known gear manufacturing concern of the Van Dorn & Dutton Company. They have been experimenting with gasoline automobiles, and expect to increase their facilities to produce these machines in considerable quantity.

The White Sewing Machine Company are preparing to push a new branch of the automobile business; the manufacture of gasoline delivery wagons for light parcel delivery. They are increasing their facilities for this work, and will shortly erect a large warehouse.

The Osborn-Morgan Company, who have recently succeeded the Amstutz-Osborn, have moved into a new factory near Case avenue and the Pennsylvania Railway, where they have commenced the manufacture of electric arc lamps. They are planning to erect another building where they will carry on the manufacture of automobiles with which they have been experimenting for some time.

The Cleveland Automobile Company, of which A. L. Moore, formerly at the head of the Cleveland Machine Screw Company, is president, have opened warerooms and an assembling shop at the corner of Lake and Bank streets, where some of the parts of their gasoline vehicle will be produced. Other parts will be furnished by Cleveland Automatic Machine Company.

The F. B. Stearns Company, manufacturers of gasoline vehicles, are planning another addition, and will install more machinery.

The Hoffman Automobile Mfg. Company have increased their capitalization, and will add to their facilities by purchasing new machinery. They manufacture both steam and gasoline vehicles.

The General Automobile & Mfg. Company are settled in their factory, which was formerly occupied by the O. P. Clay Stampings Company, and they have recently added considerable new machinery, which will increase their output to

several vehicles a week. They expect to add to their equipment by further purchases.

Otto Konigslow, who heretofore has made a specialty of automobile parts, is going into the manufacture of complete machines of the gasoline type. He will produce vehicles after specifications furnished by jobbers or dealers.

The Ohio Automobile Company of Warren, Ohio, will not remove their plant to Detroit, Mich., as has been intimated. They are increasing the facilities at Warren, and a leading Cleveland dealer has recently sold them a number of new machine tools.

The Cleveland office of the Marshall & Huschardt Machinery Company are moving into their new warerooms, mention of which was made in the last issue of this paper. It is claimed that the storeroom, which is 60 x 150 feet, will be the finest machinery establishment in the country. Samples of each of the various sizes of tools built by their principals will be maintained in operation by means of independent motors. In one show window will be a 42-inch Cincinnati planer, and in the other a 37-inch double head Bullard boring mill. Their September business fell somewhat short of that of the same month last year, caused evidently by tight money and the coal strike, but this month is showing up as well as any this year. Orders are largely for one or two tools, and seem to come from concerns which are adding to their equipment, rather than for new shops. They have recently sold the Buckeye Engine Company, Salem, a 76-inch Bullard boring mill with special drilling head, a No. 3 half universal Bickford radial drill and a No. 9 Lande's grinder. To Scholl & Simple Company, Youngstown, they have sold a 76-in Bullard boring mill, 66 inches under rail; a Baker tapping machine for fitting flanges up to 12 inches automatically, and a 30-inch 30-foot bed Flather & Co.'s lathe.

The Strong, Carlisle & Hammond Company say the business continues up to standard, but there are few large orders. The demand for Brown & Sharpe gear cutters, grinders, milling machines and screw machines is about the heaviest they have ever experienced. They have increased their floor space by leasing three additional floors in the building which they occupy. They are installing in their basement a 50 horse-power three-cylinder Walworth gas engine direct connected to a 40 kw. Western Electric generator, with which they propose to light their entire establishment.

George H. Bowler & Co., dealers in second-hand machinery, have been buying up tools of all kinds in anticipation of an increased demand this winter, and they now have stored in their warehouses in this city the largest stock of machine tools of all kinds they have ever had at one time. They have a number of heavy tools, which is unusual at this time, in view of the fact that large sized second-hand tools have been well cleaned up. During the past few months they have been handling the output of presses manufactured by the Cady Machine Company, Cleveland, and they claim to have tripled the business of this concern during that time. They will shortly announce the opening of another warehouse, which will be filled with second-hand tools recently purchased.

The Peter Gerlach Company, manufacturers of barrel and stave machinery, report from foreign countries increased demand for this class of machinery. They recently shipped an outfit of pork barrel machinery to New Zealand, and an outfit of hot saws with grinding machinery to the Compania Fundidora de Hierro y Acero, Monterey, Mexico, which concern have gone into the manufacture of steel rails and structural material. The Gerlach Company are also furnishing an outfit of nail keg stave machinery to J. B. Patterson, Sheboygan, Mich., and a complete two saw outfit to C. M. Hailey, Ontario, Va.

The McMyler Mfg. Company, hoisting and conveying machinery, are finishing up their work in this city and are moving some of their machinery to the new plant at Warren, which is commencing operations. The local plant is being offered for sale. They are building large car dumping outfits for the Cincinnati, Hamilton & Dayton Railway at Toledo, the Wheeling & Lake Erie Railway at Huron, the Pennsylvania Railway at Cleveland and Pickands, Mather & Co. at Ashtabula.

The plant of the Excelsior Hoisting Machinery Company, which is owned largely by Mr. McMyler, will be closed up eventually and consolidated with the Warren plant. It is also for sale.

The Garrett-Cromwell Engineering Company are preparing plans for the new plant of the Monessen Furnace Company, Pittsburgh, mention of which was made in the last issue of *The Iron Age*. The equipment will include two 400-ton blast furnaces, ten 50-ton open hearth basic furnaces, one 36-ton blooming mill and one 22-ton billet mill, the whole to be erected on the company's property between the P. & L. E. Railway and the Monongahela River, at Monessen, Pa. The Garrett-Cromwell Company have recently closed contracts for the equipment for the additions to the plant of the Alabama Steel & Wire Company, as follows: Mill, United Foundry & Machine Company, Pittsburgh; buildings, Riter-Conley Mfg. Company, Pittsburgh, and the Forest City Iron & Steel Company, Cleveland; blooming engines and blowing engines, Wm. Todd Company, Youngstown.

Foote, Burt & Co., manufacturers of multiple drilling machines, are now occupying three floors, 55 x 120 feet, of the new Balkwill power block on St. Clair street, in the heart of the best manufacturing district in the city. The new place gives them considerable more floor space than they had before, and with new tools, recently installed, their facilities will be more than doubled. They are also figuring on more new machinery. They are experiencing a strong demand for large tools for railway work and are building the following, among other orders: Erie Railway, Port Jervis, N. Y., a No. 2 four-spindle drill; Northern Pacific Railway, Sacramento, Cal., a four-spindle drill, fitted with a compound table and using four 2-inch drills, and Chicago, Milwaukee & St. Paul Railway, three large multiple drills. They recently shipped a torpedo boat plate drill to Yarrow & Co., Manchester, England, and are working on other foreign orders.

The American Machine Company, who do jobbing work of all kinds, have all the work they can take care of. They are building a large amount of rolling mill machinery for the Colorado Fuel & Iron Company; a number of large punches for Wm. A. Reade & Co., Cleveland; 12 automatic tappers for North & Ferry; 15 slotting machines and a large ten-spindle drill for local concerns. They are badly cramped for space and are considering making extensions.

The Ajax Mfg. Company, manufacturers of heavy forging and upsetting machinery, report a very strong demand for heavy tools for railway and bridge work. Among recent shipments of this class were the following: Allis-Chalmers Company, West Allis, Wis., one 6-inch forging machine; Pennsylvania Railway Company, Juniata shops, Juniata, Pa., a 55-ton forging machine; Diamond State Steel Company, Wilmington, Del., a large solid die rivet machine, and the Morgan Frog & Crossing Company, Chicago, a 5-inch forging machine. They are furnishing an equipment of automatic feed rivet machines to the S. Severance Mfg. Company, Pittsburgh.

The Cleveland Punch & Shear Works Company say there has been no change in the volume of business during the past two months. If anything, the demand seems to be on the increase, and they are considerably behind on deliveries. They have recently shipped to the Columbia Iron Works, Port Huron, Mich., a set of plate bending rolls, 18 feet 2 inches long, capable of bending 1-inch plate, total weight of the machine being 62 tons. To the Atlas Engine Works, Indianapolis, Ind., they have shipped a large multiple punch, 42 inches between housings. Among other large shipments the past month were the following: Chicago & Northwestern Railway, Chicago, one 18-inch throat punch; Chicago Shipbuilding Company, Chicago, two 15-foot arm radial drills; J. W. Creiger, Philadelphia, one 36-inch throat punch; Atchison, Topeka & Santa Fe Railway, Chicago, a large motor driven angle bending roll; Pan-American Bridge Company, New Castle, Ind., 30-inch rotary planer, with 8-foot bed; Pressed Steel Car Company, Allegheny, Pa., one 18-inch throat punch, and Big Four Railway, Mattoon, Ill., one Alligator shear.

The C. O. Bartlett & Snow Company are building an outfit of elevating and conveying machinery for the National Carbon Company, Cleveland; a large dryer outfit for the St. Louis Portland Cement Company; elevating and conveying machinery for the St. Louis Water Works; a dryer outfit for the U. S. Plantose Company, Saginaw, Mich., and a dryer outfit capable of drying 10,000 pounds per hour for the Keystone Fire Clay Company, Catasqua, Pa.

The Garry Iron & Steel Company say the demand for structural material seems to be on the increase rather than showing signs of a let up. The majority of their recent contracts are from concerns who are increasing their facilities. They are furnishing material for a new building for the Eberhard Mfg. Company, Cleveland; building for the Lake Erie Boiler Works Company, Cleveland; a large addition for the Lucas Machine Company, Glenville; a building for the Brown-Cochran Company, Lorain, Ohio; material for the heating plant of the Fremont Yarn Company, Fremont, Ohio, and buildings for the Elyria Iron & Steel Company, Elyria, Ohio. They are furnishing an elevating outfit of new design for the Culver Construction Company, Springfield, Ill., and are doing special work for the Colorado Fuel & Iron Company, the Lake Superior Power Company and the National Steel Company.

Work is being started on the plant which the Retort Coke Oven Company will erect on the "flats" adjoining the new plant of the Cleveland Furnace Company. The new concern will be an adjunct of the latter, and they will take the coal of the Cleveland furnace and convert it into coke, extracting the by-products, tar and ammonia. Sixty-four ovens are to be built, each to have a capacity of 6 tons daily. The plant will be in operation in the spring.

A Cleveland gentleman who is interested in the Structural Steel Car Company of Canton states that the internal dissensions in that company have been settled, and Eastern capital is being interested to complete the plant and place it in operation at once. The plant is a large one and they have a large number of orders for cars on their books. El-

wood C. Jackson of Wilmington, Del., formerly president of the company, represents the Eastern people. W. H. Woodcock will continue in the capacity of superintendent, it is stated, while J. Hornbrook, formerly engineer, has retired from the company.

The Snider-Hughes Company, pump manufacturers, have commenced work on their new plant, to be located on Sheridan, near Roland street. The machine shop will be 80 x 195 feet.

The Lucas Machine Tool Company, Glenville, will double the size of their machine shop by the erection of an addition. They have occupied their present plant only about three months.

The Ohio Rolling Mill Company, Findlay, Ohio, have been placed in the hands of receivers, in the persons of M. Silberman of Cleveland and M. Bernstein of Lima, two of the largest creditors. The liabilities are given as \$165,000. It is stated that the company are to be reorganized by Michael Jacobson and Henry Rosen of Toledo, the above mentioned receivers, together with Findlay people. The mill is at present closed for lack of fuel, but if the sale is made, it will be reopened at once and operated on a larger scale.

The Adams Brothers Bridge Company, Findlay, are increasing their facilities and installing electrical equipment to operate their machinery by individual motors.

The Jeffrey Mfg. Company, Columbus, Ohio, have found it necessary to double their force and will operate a night shift. They are experiencing great difficulty in securing machinists.

The Toledo Castings Company, Toledo, have been incorporated, with \$50,000 capital stock, by W. C. Wright, W. R. Sinclair, L. W. Storey, Martin S. Dodd and Charles A. Schmettau. They will erect a foundry.

The Defiance Business Men's Association is preparing to erect a power plant at the falls in the Auglaize River, near Defiance. They propose to supply water, power and light to the city and to manufacturing concerns which they expect to attract to Defiance.

The Ohio Talking Machine Company, Toledo, Ohio, who organized a few months ago and have since occupied small quarters, have leased a three-story building at 21 South Erie street, that city, and will install equipment to produce talking machines on a large scale.

The United States Pump & Supply Company of Toledo, who have succeeded the Bean-Chamberlain Company of Hudson, Mich., and the Standard Pump Company, Toledo, have commenced the erection of their large plant at East Toledo.

The Burt Mfg. Company of Akron, leading manufacturers of oil filters, have incorporated under Delaware laws, with \$50,000 capital stock. Officers are: W. F. Warden, president and general manager; H. F. Maranville, vice-president; H. J. Blackburn, secretary-treasurer. Heretofore the concern have been a partnership. The business will be extended by increased facilities.

The Norwalk Foundry & Machine Company, Norwalk, have been placed in the hands of a receiver. The property has been appraised and the business will be continued in charge of F. L. Stein, receiver.

A New Bessemer Steel Plant.—The International Harvester Company are erecting a steel plant and a rolling mill at their Deering Works at Chicago. The steel plant will be equipped with two 10-gross ton acid Bessemer converters and will have a capacity of about 500,000 gross tons of ingots annually, although not over 150,000 tons may be made. Work upon the Bessemer department was commenced on July 1, 1902, and the company expect to have it completed and in operation by March 1, 1903. The rolling mill will be equipped with one 35-inch two-high reversing blooming mill, with rolls 68 inches long, and one Morgan continuous mill. The latter will have eight stands of 14-inch roughing, four stands of 10-inch finishing and two stands of 8-inch finishing rolls. One three-high 13-inch finishing mill, with five stands, will also be installed. It will be used for rolling special shapes. The annual capacity of the blooming mill will be 300,000 tons, but it is not likely that over 150,000 tons will be made. The finished rolled products of the plant will be merchant bars and agricultural shapes, of which about 50,000 tons will be produced annually. The rolling mill will probably be ready for work on March 1, 1903.

Bancroft & Co., Philadelphia, Pa., manufacturers of castings of iron and brass, bronze and aluminum, valves, ejectors, steam and water gauges, metal specialties, &c., with foundry and machine shops at Lansdale, Pa., have established a temporary office at 3 North Delaware avenue, in the former city.

The New York Machinery Market.

NEW YORK, October 29, 1902.

There is an undercurrent of complaint in certain quarters of the trade indicating that there is some disposition on the part of purchasers to defer their purchases at present. A number of representative firms in the machinery trade who are usually on the optimistic side have voiced this spirit of dissatisfaction during the last week. Some of them are taking a serious view of what they term as bad signs. Others say they are experiencing simply one of the periodical lulls which overtake the trade at intervals, only to be followed by a renewed rush. Taking a broad view of the situation there appears to be enough prospective though unclosed work to warrant faith in the near future. There have been so many big deals during the last few months that a few manufacturers in each line are loaded to the limit with work in their shops. Others who were not so fortunate in connection with these contracts have had a good supply of smaller and perhaps more profitable orders, and it is a falling off of these which occasions the disquieting reports. We are not, however, able to ascertain the location of any considerable stocks of any line of machinery. Manufacturers have been working so far behind on orders of late that the prospect of being able to make fairly prompt delivery on new orders seems to scare up visions of overproduction and overstocked warerooms. Next week may see a few of the large ripening plums drop and then every one will be "busier than ever—too busy to talk."

The only large machine tool transaction which we have heard of this week involved some \$30,000 worth of tools. It was closed by the Searchmont Motor Company of Philadelphia. A large share of the business was awarded to the Garvin Machine Company and the balance was divided among the other prominent houses in the street.

Another large list has just been sent out by the Pennsylvania Railroad. The value of the tools involved will foot up to \$50,000. The machines are to be installed principally at Buffalo, where the company are making additions to their repair shops.

The International Steam Pump Company have not yet awarded contracts for any of the equipment required for their Buffalo shops. The bids are now all in and it is expected that a decision will soon be arrived at.

Prices of machine tools are holding firmly. The recent action of the National Machine Tool Builders' Association regarding attachments, &c., has not as yet produced tangible results. Nothing has been heard as yet in the trade of the decision of the committee appointed at the recent Cleveland meeting to look into this matter.

Some time ago manufacturers of geared scroll chucks came together and agreed upon a 10 per cent. advance in prices. It is said in the street that while these prices were adhered to for a time, there is now no uniformity, as cutting is again being indulged in.

It was reported that there has recently been a renewal of negotiations among the independent builders of pumping machinery with a view of forming some sort of an agreement or perhaps forming a consolidation. We are authoritatively advised that nothing has been accomplished in this direction since the Niagara Falls meeting, which we referred to several months ago. At this meeting a 10 per cent. advance in prices was proposed and we are informed that one concern made the advance and is still holding to it. The usual difficulty of overvaluation of plants seems to be the principal obstruction in the way of the pump builders arriving at any understanding.

Purchases are now being made by the Raritan Structural Steel Company, Park Row Building, New York, who are to build a large plant at New Brunswick, N. J. Aside from the power plant equipment, a large amount of special machinery and machine tools will be purchased.

The list for the equipment of the new shops to be erected at Phillipsburg, N. J., by the Ingersoll-Sergeant Rock Drill Company has not been prepared as yet. We are advised on good authority that it has been decided not to remove the Easton plant to Phillipsburg at this time, but that both plants will be operated simultaneously. The Phillipsburg plant will be gradually enlarged, and at some distant date the two plants may be consolidated on the new site.

It is reported in the trade that the Hamilton, Ohio, plant of the Niles Tool Works Company will be enlarged by the erection of a structure, 120 x 500 feet, with a gallery 50 feet wide by 500 feet long. The erection of this building, it is said, is, however, contingent upon the securing of larger foundry facilities, as their present foundry is taxed to its full capacity.

It is practically assured that the German-American Steel Ball Company of 95 Liberty street will purchase the plant of the Meriden Malleable Iron Company, at Meriden, Conn. As soon as the title for this property has been secured active negotiations will take place for the purchase of equipment for the plant. As yet no machinery has been ordered.

The Aird-Platt Mfg. Company, Watervliet, N. Y., organized some few months ago for the manufacture of cast iron fittings for pipe, are building a new plant, consisting of a

foundry, 60 x 100 feet, and a machine shop, 40 x 100 feet, two stories, and hope to have it in operation by January. Most of the required machinery has been purchased. The officers are: Alanson A. Aird, president, and Elbert S. Platt, secretary and treasurer.

The Rhode Island & Suburban Railway Company are making extensive additions to their power station on Eddy street, Providence, R. I. The plant now building was originally designed for a rated capacity of 7500 horse-power, but recently the company decided to largely augment their power equipment and contracted with Westinghouse, Church, Kerr & Co. for a new Westinghouse vertical cross compound Corliss engine designed for a maximum capacity of 6600 horse-power to be direct connected to a 2500-kw. Westinghouse 600-volt direct current railway generator. They have also contracted with Westinghouse, Church, Kerr & Co. for a complete equipment of mechanical draft and Roney mechanical stokers for the 5400 horse-power boilers which the new station will contain. Provision for the greatly increased boiler capacity will be made by the addition of a second story to the boiler house for the accommodation of the upper deck batteries.

The order for the boilers in connection with the new Perth Amboy plant of the Barber Asphalt Company was awarded to Thayer & Co.

The Watts-Campbell Company of Newark, N. J., obtained the order for the engines to be installed at the new plant of the Garfield Worsted Mills at Garfield, N. J. The order calls for three 250 horse-power units. The boiler order went to Samuel Smith & Sons of Paterson, N. J.

The Superior Portland Cement Company, who are to build a large plant at Marten's Creek, Pa., awarded their engine order, which called for 800 kw., to the Erie City Iron Works.

The 800 kw. engine order of the Erie Electric Motor Company was awarded to the Bates-Corliss Engine Company.

The Paxton Power Company, who are to erect a large electric station at Harrisburg, Pa., are now receiving bids for equipment through the engineering firm of J. G. White & Co. of 29 Broadway.

Hooven, Owens & Rentschler of 39 Cortlandt street received an order from the C. B. Woodworth & Sons Company of Rochester, N. Y., for a 350 horse-power unit.

A number of interesting orders have recently been taken by J. V. Kunze, manager of the Pelton Water Wheel Company, of 143 Liberty street, New York. One of these was awarded by the Guanajuato Power & Electric Company of Guanajuato, Mexico. This installation will include two water wheel units of 2300 horse-power each, two exciter units of 200 horse-power each and a transmission line of 110 miles in length. An interesting feature of this work is that the poles carrying the transmission line will be located at a distance of 440 feet apart. Each pole will be of structural steel, galvanized, and will be in the shape of a conical tower. The base of each tower will be approximately 10 feet square, formed of angle iron with latticed bracings. The General Electric Company will furnish the electrical apparatus and the Hotthoff Mfg. Company of Cudahy, Wis., will furnish a pipe line 3300 feet long. It is intended to double this plant next year. Henry Hine of Colorado Springs is the president of the company.

Another contract calling for a water wheel and pipe line for the San Rafael Paper Company was awarded by G. & O. Braniff of Mexico City. An addition to the pulp grinding department of the former concern necessitated the purchases, which include 1 mile of pipe and 600 horse-power of water wheels. The Vancouver Power Company of Vancouver, B. C., placed an order for three 3000 horse-power Pelton water wheels and pipe connections for a new generating station which is to be operated under a head of 390 feet.

The Goodall Worsted Company of Sanford, Maine, are building a large addition to their present works and have found it necessary to considerably enlarge the power plant. A recent purchase from the Westinghouse Electric & Mfg. Company includes a 400-k.w., two-phase alternating current generator, which will be belted to an 800 horse-power Brown engine. The generator will furnish power to all departments of the plant by means of Westinghouse induction motors, and will also provide current through transformers for lighting at 104 volts.

Ed. Brezol & Co. of Luxembourgville, Luxembourg, desires to obtain catalogues of machines for manufacturing bolts, chain, rivets, wood screws, pins, nails and horseshoe nails, and staples.

W. W. Greer, for many years engaged in the iron manufacturing business in Pennsylvania and in Goshen, Ind., died on October 26 at Sheboygan, Mich., from paralysis.

James Sherwood died October 23 at the residence of his son, Ludlow S. Sherwood, Chicago. Interment took place October 27 at Nyack, N. Y.

Iron and Industrial Stocks.

The market has been dull, except in Colorado Fuel, in which transactions were heavy, with reports of renewed buying for control by the competing interests, causing the price of the stock to advance from 83½ to 92½, the maximum being reached on Monday. Since then a moderate decline has set in. Pressed Steel, Republic, Sloss-Sheffield, Tennessee Coal, Cast Iron Pipe and United States Steel have all been strong, but fluctuations have been within narrow limits.

Pressed Steel Car Company's Statement.—The report of the Pressed Steel Car Company for the quarter ended September 30, and for the nine months ended the same date, is the most favorable thus far issued by the company. The surplus earnings for the third quarter of the year aggregated \$987,110.37, as compared with \$292,106.57 in the corresponding quarter of last year. The surplus earnings for the nine months were \$2,258,429.08, as compared with \$827,808.51 in the corresponding period of last year. The statement not only reflects the enormous amount of business transacted by the company, but the activity of the railroads as well. It is stated that the orders on the books of the company guarantee steady work for the plant throughout next year, and a continued improved showing in earnings is anticipated. Next month the company will begin the delivery of 5000 steel cars to the Pennsylvania Railroad Company. The statement of net earnings, fixed charges and surplus for the nine months ending September 30, 1902, is as follows:

	1901.	1902.
Net earnings, after all expenses of operation, cost of ordinary repairs and all renewals of plant and machinery have been charged out....	\$1,817,023.74	\$3,304,738.80
Less charges as follows: Nine months' interest, to date, on outstanding "gold notes".....	185,076.83	178,336.69
Reserve, to cover preferred stock dividend on \$12,500,000 at 7 per cent. per annum for nine months to date.....	656,250.00	656,250.00
Reserve for depreciation of works and properties.....	147,888.40	210,723.03
Surplus earnings for nine months.	\$827,808.51	\$2,258,429.08

The statement of net earnings, fixed charges and surplus for the quarter ending September 30, 1902, is:

	1901.	1902.
Net earnings, after all expense of operation, cost of ordinary repairs and all renewals of plant and machinery have been charged out....	\$626,783.32	\$1,345,526.86
Less charges as follows: Three months' interest, to date, on outstanding "gold notes".....	64,850.00	59,225.00
Reserve, to cover preferred stock dividend on \$12,500,000 at 7 per cent. per annum for three months to date.....	218,750.00	218,750.00
Reserve for depreciation of works and properties.....	51,076.75	80,441.49
Surplus earnings for third three months.....	\$292,106.57	\$887,110.37

At the meeting of the Board of Directors on October 22 the usual quarterly dividends of 1¼ per cent. on the preferred stock and 1 per cent. on the common stock were declared.

Tennessee Coal, Iron & Railroad Company.—The Tennessee Coal, Iron & Railroad Company report for the quarter ended September 30, and the nine months from January 1 to September 30:

	Third quarter.	Nine months.
Total profits from operation.....	\$533,854	\$1,786,388
Other income.....	750	750
Total income.....	\$534,604	\$1,787,138
Interest and fixed charges.....	214,622	624,377
Net earnings.....	\$319,982	\$1,162,761
Less set aside for depreciation.....	86,026	319,027
Balance.....	\$233,956	\$843,734
Less dividends on preferred stock....	4,966	18,209
Surplus.....	\$228,990	\$825,525

All current repairs and renewals of plants and machinery have been charged to operating costs.

Dividends.—The Allis-Chalmers Company have declared a dividend of 1¼ per cent. on the preferred stock, payable November 1.

The Shelby Iron Company have declared a dividend of 6 per cent. on the stock, payable November 15.

The Pressed Steel Car Company have declared a dividend of 1¼ per cent. on the preferred stock, payable November 19, and a dividend of 1 per cent. on the common stock, payable November 26.

The People's Natural Gas & Pipeage Company of Pittsburgh have declared a quarterly dividend of 1 per cent., making 7 per cent. for the year.

The directors of the Westinghouse Electric & Mfg. Company of Pittsburgh have declared the regular quarterly dividend of 1¼ per cent. upon the assenting stock, payable November 15.

The directors of the Pressed Steel Car Company of Pittsburgh have declared a quarterly dividend of 1¼ per cent. on the preferred stock, payable November 19, and a quarterly dividend of 1 per cent. on the common stock, payable November 26.

The Factory Mutual Fire Insurance Company.

The organization of the Factory Mutual Fire Insurance Company was perfected in Cleveland, Ohio, last week. Representatives of the various companies interested met in their offices at 901 and 902 Citizens' Building, Euclid avenue, and elected the following officers and directors: A. L. Garford, president Cleveland Automatic Machine Company, Cleveland, president; Thomas H. Hogsett, attorney, Cleveland, vice-president; Henry N. Staats, underwriter, Cleveland, secretary-treasurer; Charles E. Adams, Cleveland Hardware Company, Cleveland; J. D. Cox, Cleveland Twist Drill Company, Cleveland; H. J. Davies, National Carbon Company, Cleveland; J. L. Severence, National Salt Company, Akron; Wm. C. Proctor, Proctor & Gamble Company, Cincinnati; John Omwake, U. S. Lithograph Company, Cincinnati; Lucien Wulsin, Baldwin Piano Company, and Ellington Piano Company, Cincinnati; C. D. Firestone, Columbus Buggy Company, Columbus; Benj. Taft, Cotton & Woolen Mutual Fire Insurance Company, Boston, Mass.; Frederick W. Moses, Rubber Manufacturers' Mutual Fire Insurance Company, Boston, Mass.; George H. Kelley, attorney, Cleveland, directors.

Steel Forging Consolidation.—There have been important developments within the last few days in connection with the negotiations for the consolidation of the principal producers of steel forgings. A project looking toward the consolidation of these interests has been pending during the last 18 months. Options have been secured and the most difficult details overcome. It is now expected that the project will be consummated within two or three weeks.

The strike of machinists at the plants of the Indianapolis Drop Forging and other companies in Indianapolis, Ind., which has been on since May 20, has culminated in a suit by the forging company for \$5000 damages against the business agent and 33 members of the union. This plant has been closely picketed all the time by the union, to the great annoyance of the company and occasional disturbance of the peace. The defendants are charged with coercing and assaulting employees of the company. An officer of the company says that machinists in their shop have always been paid more than the union scale, have a day's work of nine hours and they have never discharged a man for belonging to the union. The strike, he says, was called because the company refused to reinstate a man they had discharged for good reasons.

The Lunkenheimer Company, manufacturers of valves, &c., formally opened the factory buildings at their new Fairmount Works, on Beekman, Tremont, Lawnway and Waverly avenues, Fairmount, near Cincinnati, on Saturday evening, October 25. They invited a large number of their customers and friends to participate with them in celebrating the completion of the plant.

There is some basis of truth for the statement that the United States Steel Corporation will make large additions to their lake fleet. The orders have not been placed, but room has been reserved at the ship yards.

The Carnegie Steel Company have blown out No. 4 blast furnace of the Duquesne plant, at Duquesne. The stack will be relined and otherwise improved. The furnace will be out of blast about two months, and it is said about \$250,000 will be spent in improving it.

The report that the National Tube Company of Pittsburgh had received a very large contract for pipe for shipment to South Africa has been officially denied.

HARDWARE.

THE remarkable difference in the general conditions of business in England, as compared with this country, is indicated in the advancing tendency of wages here as contrasted with the downward movement in Great Britain. There was in the latter country a marked decline in wages in 1901, the amount of the reductions that year being greater than the total reductions of the preceding eight years, but what makes the matter more significant is the fact that during the first half of the present year, concerning which figures are available, the tendency continues to be in the direction of lower prices. While these changes in the labor market are taking place in England they are significant in a large way as indicating an ebbing in the prosperity of that country, and may thus be construed as precautionary signals for the world at large. There would be more reason for this, however, if it were not for the continued large volume of business and the prevalence of generally prosperous conditions here. It should be remembered, however, that with these lower costs the English manufacturers will be in a better position to meet the increasing competition of this country, in which, on the other hand, the effect of the gradually advancing wages will give, for the time being at least, higher costs.

It is not unlikely, too, that the effect of depressed conditions in Great Britain will result in increased enterprise and effort in placing goods in other markets. There is a perceptible awakening of the trade in that country to the necessity of changing many of the methods which in view of the progress of competing nations have become altogether too cumbersome and antiquated for the intense competition which is sure to characterize international trade relations. An illustration of the operation of this principle in Germany is found in the increased foreign business which is doing in Bicycles. While the exports of Bicycles from the United States and England have considerably diminished in late years, those of Germany have steadily increased. This tendency is reflected in recent statistics. The value of German Bicycles exported in 1901 was about \$3,000,000, as against about \$2,500,000 for 1900, while during the first half of the present year the exports of these goods from Germany amounted to nearly as much as during the entire year 1900. Thus unusual increase is not on account of superior quality or advantage in manufacturing on the part of Germany, but has its cause in the depressed condition of that country, which compels the Bicycle manufacturers to force sales in foreign markets in order to get rid of accumulated stocks and to keep their works and operatives employed, although to do this it is necessary to sell goods at prices which involve an actual loss. There is no doubt that this is indicative of the strenuousness of the contest for foreign trade and the efforts which will be made both in England and on the Continent to resist the growing encroachment of American manufacturers. There is little doubt that the latter will find the capturing of the world's markets to be a sufficiently difficult undertaking to call out their best endeavors. In the meantime manufacturers here are in many lines making a splendid preparation, in their improved methods and greatly increased output, for resuming the efforts to secure foreign business which have been to too great an extent interrupted by the engrossing demands of domestic trade.

Condition of Trade.

The manufacturers are receiving a good many orders for their products, notwithstanding the fact that their customers have already purchased freely and have in many cases unexecuted orders. The volume of business is such that jobbers' stocks are being depleted and are in many lines broken. Current business with the smaller trade is heavy, and their orders are being received frequently by both manufacturers and jobbers covering well assorted lots. In lines which have to do with building operations trade is excellent. Builders' Hardware is difficult to get in sufficient quantities to meet requirements. Many kinds of Mechanics' Tools are scarce and slow in coming from the makers. The declines which have taken place in the market have some effect on buyers, making them hesitate a little about placing orders, but it is thought that this influence will not be of long duration. The reduction in Wire Nails and the coarser Wires, for example, had a temporary effect on the market, but this lasted only a very short time, and the market has entirely recovered tone, so that the present month will undoubtedly be one of the heaviest of the year, as the trade are buying freely and in large quantities. The influence of the announced reduction in the price of Shovels has also a slightly injurious effect on the market for the time being, but it is anticipated that it will very soon be accepted as an inevitable occurrence in a line in which unhealthful conditions had developed. Regarded in this light the decline may be considered with satisfaction as removing a menace which has long been hanging over the market and leaving the general situation more sound. Fortunately the number of lines in which prices are extravagantly high is not large, when compared with the ruling prices for the raw material, and until there is an important decline in Iron and Steel there is little reason to apprehend a general shrinkage of values in the manufactured products.

Chicago.

(By Telegraph.)

The colder weather which has prevailed during the past few days has stimulated the demand for Shells and Ammunition materially. There has also been a more active movement in other fall and winter goods, more especially in such lines as Skates, Toys, Pocket Knives, Carvers and other goods suited to the holiday trade. Jobbers who have been caught with stocks of Shovels are loud in denunciation of manufacturers because unprotected from the decline recently suffered. The market had previously been so unsettled, however, through keen competition, that it is recognized by others that manufacturers could scarcely do otherwise than make the recent adjustment. The distribution of Wire Goods, Enameled Ware and other Kitchen Utensils has continued on a liberal scale, the demand for Sad Irons and Coffee Mills being especially active, and some distributors have found difficulty in obtaining supplies, especially certain kinds of Mills. The establishment of the schedule on Wire Goods and on Wire Netting has been followed by liberal orders secured by manufacturers and in turn almost immediately by liberal sales by jobbers for spring delivery. Most jobbers have also experienced a good demand for Lawn Mowers, Refrigerators and Poultry Netting for spring delivery. There has also been an early call upon jobbers for Hoes, Rakes, Forks and other Steel Goods for next year's delivery. A notable feature in the present business is the closeness with which jobbers are following manufacturers in the placing of goods of all kinds for spring delivery. An unusual scarcity has developed in Carpenters' Planes and Rules, which are wanted for immediate distribution. The demand for Axes, Stoves, Heaters, Stove Boards, Stove Pipe, &c., shows but little falling off. There are a fair number of orders being booked by

manufacturers for Builders' Hardware for early shipment, but only a few orders have thus far been taken for next year's delivery. Some cheap grades of Butts and Strap and T Hinges are being offered, but make little impression upon the prices for standard goods, which are firm, with an upward tendency. In Heavy Hardware there has been less activity but a fair movement. The Nail situation has still some interesting features, but present prices allow of little variation in the market.

St. Louis.

(By Telegraph.)

The movement of Hardware products evidences no sign of diminution, and in trade circles reports generally are of the most encouraging character. Owing to an error in printing, the St. Louis report of last week was abbreviated to a point where it conveyed no idea of the general conditions in the market. This was due to its being confused with the report of Chicago, appearing immediately above it in the same column. Shipments of Stove Goods, Tinware and Steel Goods of all varieties including Cutlery continue strong features. The heavy department of the market is caring for a good volume of trade, but some disappointment has been expressed in the total volume of sales as compared with the same period in other seasons. Improvement, though, is said to be showing in certain directions.

NOTES ON PRICES.

Wire Nails.—The market for Wire Nails is in excellent condition when judged by the volume of business. The trade are purchasing liberally and manufacturers are working to their full capacity. Indications are that the present month will be heavier than any previous month of the year. Prices are apparently firmly maintained on the following basis:

Jobbers, carload lots.....1.85
Retailers, carload lots.....1.90
Retailers, less than carloads.....2.00
F.o.b. Pittsburgh. Terms, 60 days, or 2 per cent. discount for cash in 10 days.

New York.—The volume of current business is satisfactory, though not especially heavy. Merchants generally are referred to as carrying only moderate stocks, but are now replenishing with a good degree of confidence. Quotations are as follows: Single carloads, \$2.05; small lots from store, \$2.10 to \$2.15.

Chicago, by Telegraph.—There has been quite an active demand for Wire Nails for early shipment, both combination and independent manufacturers booking satisfactory orders for delivery during the current year. The report that any contracts have been made for delivery after January 1 has been emphatically denied. There certainly seems no good basis for the report. If independent manufacturers have shaded quotations the evidence has not been conspicuous. The jobbing trade has continued fair and prices have been well sustained. Official quotations remain steady on the basis of \$2 in carload lots, and \$2.10 in less than carload lots, Chicago.

St. Louis, by Telegraph.—The movement of Wire Nails in this market through the jobbing trade is in fair volume. For small lots from store \$2.15 is asked.

Pittsburgh.—A moderate amount of new business in Wire Nails is being placed and specifications of old contracts are said to be coming forward more freely than for some time. It is said that existing quotations are being very generally adhered to and that there is an entire absence of any cutting in prices. We quote Wire Nails at \$1.85 to \$1.90 in carloads, and \$1.95 in small lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days. For galvanizing Nails 75 cents per keg extra is charged and for tinning Nails \$1.50 per keg extra.

Cut Nails.—There continues to be a good demand for Cut Nails, and there is some complaint on the part of the trade in regard to difficulty in having orders executed promptly. Quotations are as follows: \$2.05, base, in carloads, and \$2.10 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms, 60 days, less 2 per cent. off in 10 days.

New York.—A steady local demand is reported, indicating good activity in building and the favor with which Cut Nails, as compared with Wire Nails, are regarded. Quotations for carloads and less than carloads are as follows:

Carloads on dock.....\$2.18
Less than carloads on dock.....2.23
Small lots from store.....2.30

Chicago, by Telegraph.—There has been but a moderate degree of activity. Prices have remained steady on the basis of \$2.10 to \$2.15 in carload lots, and \$2.20 to \$2.25 in less than carload lots, base, Chicago.

St. Louis, by Telegraph.—Jobbers report Cut Nails in fair demand, and \$2.30 is the quotation for small lots from stock.

Pittsburgh.—We note a moderate demand for Cut Nails and the tone of the market is quite steady. It is probable the fact that prices of Wire Nails are now lower than Cut Nails will cause some consumers of the latter to change over to Wire Nails. Iron Cut Nails command from 10 to 15 cents advance over Steel. We quote Steel Cut Nails as follows: \$2.05, base, in carloads, and \$2.10 in less than carloads, plus freight in Tube Rate Book to point of destination, terms 60 days, less 2 per cent. off in 10 days.

Barb Wire.—The market for Barb Wire is without special feature, except that the trade in some sections are buying more liberally, giving little reason for complaint in regard to the volume of business. At the reduced prices the market has a firm tone, and little complaint is made that quotations are shaded. We continue to quote as follows: Painted, in carloads, \$2.15 to \$2.20; Galvanized, \$2.45 to \$2.50; less than carloads, Painted, \$2.20 to \$2.30; Galvanized, \$2.50 to \$2.60, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days.

Chicago, by Telegraph.—There has been a fair movement on old contracts and a moderate amount of new business, as usual at this time of year. The jobbing trade has been quiet, but prices have remained stationary for Galvanized at \$2.60 in carload lots and \$2.70 in less than carload lots, and Painted at \$2.30 in carload lots and \$2.40 in less than carload lots, Chicago.

St. Louis, by Telegraph.—A fair volume of demand and inquiry for Barb Wire continues to be reported in this market. Jobbers quote, in small lots, Painted at \$2.50 and Galvanized at \$2.80.

Pittsburgh.—The market continues quiet and the volume of new tonnage being placed is relatively small. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount off for cash in 10 days: Painted, \$2.15; Galvanized, \$2.45, in carloads; less than carload lots, Painted, \$2.20; Galvanized, \$2.50.

Plain Wire.—There is an increased demand for Plain Wire, and the market has a good tone. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. for cash in 10 days: Carloads, \$1.80; less than carloads, \$1.90. The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	Plain.	Add
	Base.	Galv.
6 to 9.....	\$0.05	\$0.30
10.....	.10	.30
11.....	.15	.30
12 and 12½..	.25	.30
13.....	.35	.30
14.....	.45	.60
15.....	.55	.60
16.....	.70	1.00
17.....	.85	1.00
18.....		

Chicago, by Telegraph.—The tone of the market is firm, with a fair degree of activity, prices remaining unchanged for carload lots on the basis of \$1.90, and less than carload lots at \$2, Chicago, from store, Galvanized bringing 30 cents extra.

St. Louis, by Telegraph.—The jobbing trade report little improvement in the demand for Plain Wire. In small lots from stock No. 9 is quoted at \$2.10 and Galvanized at \$2.40.

Pittsburgh.—A fair amount of tonnage is being placed, probably larger than for some time. The tone of the market is firm and it is said that existing prices are being rigidly held. We quote Plain Wire at \$1.75 to \$1.80, base, for Nos. 6 to 9; Galvanized, 30 cents extra for Nos. 6 to 14, and 60 cents extra for Nos. 15 and 16.

Wire Cloth and Poultry Netting.—The manufacturers of Wire Cloth and Poultry Netting have made their prices for next season, and they may, in a general way, be referred to as about 10 per cent. higher than those of a year ago. In Poultry Netting a difference of 5 per cent. is made between the goods galvanized after weaving and those galvanized before weaving. The higher prices ruling for spelter add perceptibly to the cost of the Netting. The market on these lines has a firm tone, and the trade are placing orders liberally. The decline which has taken place in Wire Nails and Barb and other Wires may have given some the impression that Wire products generally are weak, but this does not seem to be the case as the prices on fine Wires are maintained quite firmly and the trade are buying goods made of them with confidence.

Wrought Iron Pipe.—The market for Wrought Iron Pipe continues to show signs of weakness and concessions below what might be regarded as the regular prices are obtainable. On the smaller sizes on which the competition is most active concessions are more readily obtained.

Shovels and Spades.—There has been no important change in Shovels and Spades during the week, except that the new prices of the manufacturers are being quietly made known to the principal buyers. The sale of the goods has naturally been interfered with seriously by the announcement of the reduction which is to be made November 15, and jobbers are freely shading prices in anticipation of that date. The independent factories have not as yet made public announcement in regard to their policy or prices, and it remains to be seen whether or not they will follow the lead of the associated manufacturers in abandoning the animal brand grade.

Sheet Zinc.—Mattheissen & Hegeler Zinc Company, La Salle, Ill., have issued a circular under date October 14, in which the price of Sheet Zinc is announced as \$6.50 per 100 pounds, delivered free on board cars, La Salle, in 600-pound casks, of the thicknesses from Nos. 9 to 22 inclusive, and of the widths from 32 to 60 inches inclusive, and of the lengths from 84 to 96 inches inclusive. The following discounts are given:

	Cash	Quantity.	Total.
	with order.	Per cent.	Per cent.
Carload lots.....	3	5	8
9000-pound lots.....	3	3	6
6000-pound lots.....	3	2	5
3000-pound lots.....	3	1	4
Less than 3000 pounds.....	3	0	3

They also announce the following revised extras in cents per 100 pounds:

Extras in Cents Per 100 Pounds.				
Numbers	5	6	7	8
32 to 40 x 84.....	50	30	15	10
24 x 84.....	85	20	10	5
26 x 84.....	110	20	10	5
28 x 84.....	95	75	55	45
30 x 84.....	80	60	45	35
48 x 84.....	80	10	None.	None.
50 x 84.....	90	15	None.	None.
52 x 84.....	100	20	None.	None.
60 x 84.....	205	80	45	15
36 x 96.....	70	35	20	10
48 x 96.....	115	60	25	None.
36 x 108.....	60	45	35	25
48 x 108.....	145	75	30	20
62 x 84.....	Extra given on application.			

No extra charges for heavier numbers.

The extra on No. 4 36 x 84 is \$1.85 per 100 pounds.

Extra Charges for Small Packages and for Selected Zinc.

100-pound casks [all numbers up to No. 12 inclusive], 30 cents per 100 pounds.

100-pound boxes [not larger than 30 x 40 inches], 30 cents per 100 pounds.

200 and 300 pound casks [all numbers up to No. 14 inclusive], 20 cents per 100 pounds.

200 and 300 pound boxes [not larger than 36 x 50 inches], 20 cents per 100 pounds.

Sash Weights.—The Sash Weight market is in an unusually satisfactory condition, and prices are much

more regular than is generally the case. The strength of the market for the raw material and the harmony in which the manufacturers are working together contribute to this condition. The foundries in the western and central districts recently advanced the price to \$25 per ton in car lots, and \$27 in less than car lots.

Cordage.—The Rope market continues in a quiet condition, demand being moderate. According to maker and quality of goods, quotations are as follows: Manila, on the basis of 7-16-inch and larger, 12¼ to 12½ cents per pound; Sisal, on the same basis, 9¼ to 10 cents per pound. It is probable that these quotations are sometimes shaded.

Glass.—Local jobbers complain of the lack of demand for Glass, which has been a characteristic feature of the market during the summer and fall. This is attributable to a considerable extent to the impression received by the trade that prices would be lower in the fall. The uncertainty as to the future of the market which existed during the summer naturally led to this conclusion. The Jobbers' Association expected to place their order for fall delivery of Glass at lower figures than they paid for the previous lot, but in this they were disappointed. Taking into account the rate of wages paid the workmen, and the fact that most of the factories in the country are controlled by the consolidated companies or are working in harmony with them, there is little prospect of lower priced Glass during this fire. Some jobbers assert that prices may be higher, as the consolidated companies are in a position to demand any price they may see fit. In the meantime retailers are cutting up larger sizes of Glass to supply their trade, the Glass having been bought at much below present figures. The Jobbers' Association quotations are as follows for single and double strength Window Glass:

Discount.....	.88 and 5 %
F.o.b. factory, carload lots.....	.89 and 5 %

Paints and Colors.—Leads.—The demand for immediate deliveries of White Lead in Oil for consumption is quite liberal, owing to the favorable weather conditions for outdoor work. Quotations are as follows: In lots of 500 pounds or over, 6 cents per pound; in lots of less than 500 pounds, 6½ cents per pound.

Oils.—Linseed Oil.—With the advance in the price of Flax Seed at the close of last week cheap lots of Western Oil were withdrawn from the market, resulting in a stronger feeling. It is understood that considerable Oil has been sold for November-January delivery at 43 cents, but that buyers are now holding out for lower prices. The demand for spot Oil in small lots continues. City Raw is quoted, according to quantity, from 46 to 47 cents per gallon. State and Western brands are quoted at 45 cents for any quantity.

Spirits Turpentine.—The higher prices which have ruled for the past two weeks have restricted purchases of large lots to a considerable extent. As a result values have declined and quotations, according to quantity, are as follows: Southern, 54 to 54¼ cents; machine made barrels, 54½ to 55 cents per gallon.

R. E. DIETZ COMPANY'S LONDON EXHIBIT.

A FINE exhibit was made by the R. E. Dietz Company, 60 Lighthouse street, New York, at the American exhibition in the Crystal Palace, London, which opened May 1, 1902, and closed October 1. The company showed a full line of samples of their wide assortment of Tubular Lanterns and Motor Lamps, which are widely marketed, both in the United States and abroad, the display being given under the auspices of their English branch house, Saracen Chambers, Snow Hill, London, E. C.

ADOLPH H. PAULSEN of Bergen, Norway, is now in this country on a visit to his principals, the Nicholson File Company and Joseph Dixon Crucible Company, whose products he sells to the dealers in the Scandinavian countries, Norway, Sweden and Denmark, traveling the territory at frequent intervals. Mr. Paulsen last visited this country six years ago. He will return in about two weeks.

PAINTS IN THE HARDWARE STORE.

MANY Hardware dealers have discovered that they possess distinct advantages over drug stores for the distribution of Paints, Colors and Painters' Supplies. Many of the most advanced dealers have put in stocks of these goods, which have resulted in benefit to themselves and to the painters and contractors of buildings. The manufacturers of Paints also have not been slow to recognize that Hardware dealers afford much better avenues to consumers of their goods. It has been demonstrated that the Hardware dealer handles in larger quantity, carries better quality and pushes trade much more energetically than do the dispensers of drugs.

In recent issues we have published many letters from manufacturers and merchants in which the advantages and desirability of handling this line have been pointed out. The following expressions from other correspondents will also be of interest:

Every Hardwareman Should Handle It.

From a Large Retailer in Michigan: Paint can be handled to advantage by every Hardware merchant, or at least I have been successful in that line. I think the Hardware store is the proper place for Paints, Oils, &c. In this part of the country every Hardware merchant handles this line in connection with his Hardware business.

Paints and Hardware a Natural Combination.

From a Large House in Indiana: We are selling Paints, Oils and Varnishes in connection with our retail Hardware business, and think this line rightfully belongs to us. We were forced to handle it. We find that the first thing a customer asks when he starts to build is, "How do you sell Nails?" and then he goes from store to store, and where the dealer will sell him the Nails the cheapest there he will buy, as he thinks he is at the cheapest place. He nearly always claims to have the cash to build the house, but when he gets to the purchase of Hardware he finds that he is short of funds and makes arrangements with the dealer for credit, and the Paint being the last item he asks the dealer to get it for him, as he would like to have the account all at one place. This is the case with farmers, and in the city the contractor takes the full contract and likes to have his account at one place as much as possible, so that in the smaller cities Paints, &c., should go with Hardware.

Hand in Hand with Hardware.

From a Michigan Merchant: Paints and Oils go hand in hand with Hardware and are handled by all the Hardware dealers here.

Unquestionably Kindred Lines.

From a Kentucky Retailer: Paints and Hardware are unquestionably kindred lines. The subject of combining Paints with Hardware has been persistently urged in your valuable paper. About 12 years ago I was exclusively a Paint maker and dealer, but I found by adding Hardware I could do business with the contractors in both lines. The healthy part of the Paint business is to get in on the ground floor.

Experience of Several Years.

From a Merchant in Michigan: We have handled Paints, Oils, &c., in connection with the Hardware business for several years, and it is our opinion that this line of goods can be handled advantageously by Hardware merchants generally.

An Evolution in the Paint Business.

From a Western Manufacturer: We distribute a great deal of our Paints through both the drug and Hardware jobber, and during recent years our experience has been that the trade is gradually drifting from the drug to the Hardware jobber. We are now supplying a number of Hardware jobbers with a line of our Mixed Paints, and judging from the amount they handle, would infer that they consider Paint a very profitable addition to their business.

We also sell direct to the retail Hardware dealer and find an increasing demand from this class of trade.

A great many of them express themselves as being highly pleased with the Paint end of their business, claiming that with practically no additional expense for clerk hire, rent, &c., and with but a very small investment in stock, they are enabled to make a material increase in their profits.

It looks to us as though the retail Paint business rightfully belongs to the Hardware dealer in towns that are not large enough to admit of an exclusive Paint and Wall Paper store.

Paint Business with Hardwaremen Increasing.

From an Ohio Manufacturer: An increasing number of Hardware merchants are recognizing the advantage of this department of business, and Paint certainly belongs to the building trade as truly as Hardware. Our own experience with Hardware merchants has been very satisfactory and many of our representatives in various parts of the country are successful in this business. We appreciate your wise presentation of this subject to your readers.

Hardware Trade the Proper Channel.

From a Pennsylvania Manufacturer: We have read your articles on Paints in the Hardware store, which bear out our 20 years' experience that the Hardware trade is the proper channel for the distribution of Paints. Our experience has been that druggists are gradually discontinuing this line and the Hardware people are taking it up as more properly belonging to their line of goods, with the exception of large cities, which are able to support exclusive Paint stores.

Paint Trade Drifting Into Hardware Hands.

From a Manufacturer in Illinois: We have quite a few Hardware dealers among our line of customers and believe that the trade is drifting more and more into the hands of the Hardware trade, as against lumber dealers and drug men, who handled most of the prepared Paints in years gone by.

Hardwaremen Their Most Satisfactory Customers.

From a New England Manufacturer: The Hardware trade of New England are quite generally carrying Paint and White Lead. The lines are analogous, and while we are to some extent selling the drug dealers, our most satisfactory business comes from the Hardware and builders' supply trade. As the margin of profit on first-class Mixed Paints is large, it is a question of but a very short time before the Hardware trade throughout this entire section will be carrying a full and complete line of Paints, White Lead and Oil.

Number of Hardware Customers Continually Increasing.

From a Manufacturer in the West: We have considerable trade among Hardware people, and are constantly adding to it. Our views on this subject therefore coincide with similar letters which you have published.

Experiences of Merchants in an Eastern Town.

The following views as to the desirability of handling Paints in Hardware stores were expressed by merchants in a town of a nearby State. It will be seen that there is not a uniformity of opinion on the subject:

DISCONTINUED THE SALE.—We carried Mixed Paints in a small way for some time, but two or three years ago some parties started in the Paint business exclusively a few doors from us. As they handled a much larger stock and better assortment than we could, we discontinued handling this line.

COLORS PROFITABLE.—There is money in Colors, but not in Lead, Oil and Turpentine. We only handle such Dry Colors and Oils as naturally belong to our mill supply department. Reliable house painters can buy their material direct from manufacturers who cater to this class of trade. The miserable painters to whom manufacturers will not sell run up a bill for a job with the Hardwareman, and it's cents to doughnuts if the merchant does not get stuck for the greater part of the bill.

CASH SALES ALMOST EXCLUSIVELY.—We have been selling Paints and Oils for the past three years, not pushing the line to any great extent, but find it profitable.

Pittsburgh.—A fair amount of tonnage is being placed, probably larger than for some time. The tone of the market is firm and it is said that existing prices are being rigidly held. We quote Plain Wire at \$1.75 to \$1.80, base, for Nos. 6 to 9; Galvanized, 30 cents extra for Nos. 6 to 14, and 60 cents extra for Nos. 15 and 16.

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Wrought Iron Pipe.—The market for Wrought Iron Pipe continues to show signs of weakness and concessions below what might be regarded as the regular prices are obtainable. On the smaller sizes on which the competition is most active concessions are more readily obtained.

Shovels and Spades.—There has been no important change in Shovels and Spades during the week, except that the new prices of the manufacturers are being quietly made known to the principal buyers. The sale of the goods has naturally been interfered with seriously by the announcement of the reduction which is to be made November 15, and jobbers are freely shading prices in anticipation of that date. The independent factories have not as yet made public announcement in regard to their policy or prices, and it remains to be seen whether or not they will follow the lead of the associated manufacturers in abandoning the animal brand grade.

Sheet Zinc.—Mattheissen & Hegeler Zinc Company, La Salle, Ill., have issued a circular under date October 14, in which the price of Sheet Zinc is announced as \$6.50 per 100 pounds, delivered free on board cars, La Salle, in 600-pound casks, of the thicknesses from Nos. 9 to 22 inclusive, and of the widths from 32 to 60 inches inclusive, and of the lengths from 84 to 96 inches inclusive. The following discounts are given:

	Cash with order. Per cent.	Quantity. Per cent.	Total. Per cent.
Carload lots.....	3	5	8
9000-pound lots.....	3	3	6
6000-pound lots.....	3	2	5
3000-pound lots.....	3	1	4
Less than 3000 pounds.....	3	0	3

They also announce the following revised extras in cents per 100 pounds:

Extras in Cents Per 100 Pounds.					
Numbers	5	6	7	8	9
32 to 40 x 84.....	50	30	15	10	None.
24 x 84.....	85	20	10	5	None.
26 x 84.....	110	20	10	5	None.
28 x 84.....	95	75	55	45	None.
30 x 84.....	80	60	45	35	None.
48 x 84.....	80	10	None.	None.	None.
50 x 84.....	90	15	None.	None.	None.
52 x 84.....	100	20	None.	None.	None.
60 x 84.....	205	80	45	15	None.
36 x 96.....	70	35	20	10	None.
48 x 96.....	115	60	25	None.	None.
36 x 108.....	60	45	35	25	10
48 x 108.....	145	75	30	20	None.
62 x 84.....	Extra given on application.				

No extra charges for heavier numbers.

The extra on No. 4 36 x 84 is \$1.85 per 100 pounds.

Extra Charges for Small Packages and for Selected Zinc.

100-pound casks [all numbers up to No. 12 inclusive], 30 cents per 100 pounds.

100-pound boxes [not larger than 30 x 40 inches], 30 cents per 100 pounds.

200 and 300 pound casks [all numbers up to No. 14 inclusive], 20 cents per 100 pounds.

200 and 300 pound boxes [not larger than 36 x 50 inches], 20 cents per 100 pounds.

Sash Weights.—The Sash Weight market is in an unusually satisfactory condition, and prices are much

more regular than is generally the case. The strength of the market for the raw material and the harmony in which the manufacturers are working together contribute to this condition. The foundries in the western and central districts recently advanced the price to \$25 per ton in car lots, and \$27 in less than car lots.

Cordage.—The Rope market continues in a quiet condition, demand being moderate. According to maker and quality of goods, quotations are as follows: Manila, on the basis of 7-16-inch and larger, 12¼ to 12½ cents per pound; Sisal, on the same basis, 9¼ to 10 cents per pound. It is probable that these quotations are sometimes shaded.

Glass.—Local jobbers complain of the lack of demand for Glass, which has been a characteristic feature of the market during the summer and fall. This is attributable to a considerable extent to the impression received by the trade that prices would be lower in the fall. The uncertainty as to the future of the market which existed during the summer naturally led to this conclusion. The Jobbers' Association expected to place their order for fall delivery of Glass at lower figures than they paid for the previous lot, but in this they were disappointed. Taking into account the rate of wages paid the workmen, and the fact that most of the factories in the country are controlled by the consolidated companies or are working in harmony with them, there is little prospect of lower priced Glass during this fire. Some jobbers assert that prices may be higher, as the consolidated companies are in a position to demand any price they may see fit. In the meantime retailers are cutting up larger sizes of Glass to supply their trade, the Glass having been bought at much below present figures. The Jobbers' Association quotations are as follows for single and double strength Window Glass:

	Discount.
From store.....	.88 and 5 %
F.o.b. factory, carload lots.....	.89 and 5 %

Paints and Colors.—**Leads.**—The demand for immediate deliveries of White Lead in Oil for consumption is quite liberal, owing to the favorable weather conditions for outdoor work. Quotations are as follows: In lots of 500 pounds or over, 6 cents per pound; in lots of less than 500 pounds, 6½ cents per pound.

Oils.—**Linseed Oil.**—With the advance in the price of Flax Seed at the close of last week cheap lots of Western Oil were withdrawn from the market, resulting in a stronger feeling. It is understood that considerable Oil has been sold for November-January delivery at 43 cents, but that buyers are now holding out for lower prices. The demand for spot Oil in small lots continues. City Raw is quoted, according to quantity, from 46 to 47 cents per gallon. State and Western brands are quoted at 45 cents for any quantity.

Spirits Turpentine.—The higher prices which have ruled for the past two weeks have restricted purchases of large lots to a considerable extent. As a result values have declined and quotations, according to quantity, are as follows: Southern, 54 to 54¼ cents; machine made barrels, 54½ to 55 cents per gallon.

R. E. DIETZ COMPANY'S LONDON EXHIBIT.

A FINE exhibit was made by the R. E. Dietz Company, 60 Lalignt street, New York, at the American exhibition in the Crystal Palace, London, which opened May 1, 1902, and closed October 1. The company showed a full line of samples of their wide assortment of Tubular Lanterns and Motor Lamps, which are widely marketed, both in the United States and abroad, the display being given under the auspices of their English branch house, Saracen Chambers, Snow Hill, London, E. C.

ADOLPH H. PAULSEN of Bergen, Norway, is now in this country on a visit to his principals, the Nicholson File Company and Joseph Dixon Crucible Company, whose products he sells to the dealers in the Scandinavian countries, Norway, Sweden and Denmark, traveling the territory at frequent intervals. Mr. Paulsen last visited this country six years ago. He will return in about two weeks.

PAINTS IN THE HARDWARE STORE.

MANY Hardware dealers have discovered that they possess distinct advantages over drug stores for the distribution of Paints, Colors and Painters' Supplies. Many of the most advanced dealers have put in stocks of these goods, which have resulted in benefit to themselves and to the painters and contractors of buildings. The manufacturers of Paints also have not been slow to recognize that Hardware dealers afford much better avenues to consumers of their goods. It has been demonstrated that the Hardware dealer handles in larger quantity, carries better quality and pushes trade much more energetically than do the dispensers of drugs.

In recent issues we have published many letters from manufacturers and merchants in which the advantages and desirability of handling this line have been pointed out. The following expressions from other correspondents will also be of interest:

Every Hardwareman Should Handle It.

From a Large Retailer in Michigan: Paint can be handled to advantage by every Hardware merchant, or at least I have been successful in that line. I think the Hardware store is the proper place for Paints, Oils, &c. In this part of the country every Hardware merchant handles this line in connection with his Hardware business.

Paints and Hardware a Natural Combination.

From a Large House in Indiana: We are selling Paints, Oils and Varnishes in connection with our retail Hardware business, and think this line rightfully belongs to us. We were forced to handle it. We find that the first thing a customer asks when he starts to build is, "How do you sell Nails?" and then he goes from store to store, and where the dealer will sell him the Nails the cheapest there he will buy, as he thinks he is at the cheapest place. He nearly always claims to have the cash to build the house, but when he gets to the purchase of Hardware he finds that he is short of funds and makes arrangements with the dealer for credit, and the Paint being the last item he asks the dealer to get it for him, as he would like to have the account all at one place. This is the case with farmers, and in the city the contractor takes the full contract and likes to have his account at one place as much as possible, so that in the smaller cities Paints, &c., should go with Hardware.

Hand in Hand with Hardware.

From a Michigan Merchant: Paints and Oils go hand in hand with Hardware and are handled by all the Hardware dealers here.

Unquestionably Kindred Lines.

From a Kentucky Retailer: Paints and Hardware are unquestionably kindred lines. The subject of combining Paints with Hardware has been persistently urged in your valuable paper. About 12 years ago I was exclusively a Paint maker and dealer, but I found by adding Hardware I could do business with the contractors in both lines. The healthy part of the Paint business is to get in on the ground floor.

Experience of Several Years.

From a Merchant in Michigan: We have handled Paints, Oils, &c., in connection with the Hardware business for several years, and it is our opinion that this line of goods can be handled advantageously by Hardware merchants generally.

An Evolution in the Paint Business.

From a Western Manufacturer: We distribute a great deal of our Paints through both the drug and Hardware jobber, and during recent years our experience has been that the trade is gradually drifting from the drug to the Hardware jobber. We are now supplying a number of Hardware jobbers with a line of our Mixed Paints, and judging from the amount they handle, would infer that they consider Paint a very profitable addition to their business.

We also sell direct to the retail Hardware dealer and find an increasing demand from this class of trade.

A great many of them express themselves as being highly pleased with the Paint end of their business, claiming that with practically no additional expense for clerk hire, rent, &c., and with but a very small investment in stock, they are enabled to make a material increase in their profits.

It looks to us as though the retail Paint business rightfully belongs to the Hardware dealer in towns that are not large enough to admit of an exclusive Paint and Wall Paper store.

Paint Business with Hardwaremen Increasing.

From an Ohio Manufacturer: An increasing number of Hardware merchants are recognizing the advantage of this department of business, and Paint certainly belongs to the building trade as truly as Hardware. Our own experience with Hardware merchants has been very satisfactory and many of our representatives in various parts of the country are successful in this business. We appreciate your wise presentation of this subject to your readers.

Hardware Trade the Proper Channel.

From a Pennsylvania Manufacturer: We have read your articles on Paints in the Hardware store, which bear out our 20 years' experience that the Hardware trade is the proper channel for the distribution of Paints. Our experience has been that druggists are gradually discontinuing this line and the Hardware people are taking it up as more properly belonging to their line of goods, with the exception of large cities, which are able to support exclusive Paint stores.

Paint Trade Drifting Into Hardware Hands.

From a Manufacturer in Illinois: We have quite a few Hardware dealers among our line of customers and believe that the trade is drifting more and more into the hands of the Hardware trade, as against lumber dealers and drug men, who handled most of the prepared Paints in years gone by.

Hardwaremen Their Most Satisfactory Customers.

From a New England Manufacturer: The Hardware trade of New England are quite generally carrying Paint and White Lead. The lines are analogous, and while we are to some extent selling the drug dealers, our most satisfactory business comes from the Hardware and builders' supply trade. As the margin of profit on first-class Mixed Paints is large, it is a question of but a very short time before the Hardware trade throughout this entire section will be carrying a full and complete line of Paints, White Lead and Oil.

Number of Hardware Customers Continually Increasing.

From a Manufacturer in the West: We have considerable trade among Hardware people, and are constantly adding to it. Our views on this subject therefore coincide with similar letters which you have published.

Experiences of Merchants in an Eastern Town.

The following views as to the desirability of handling Paints in Hardware stores were expressed by merchants in a town of a nearby State. It will be seen that there is not a uniformity of opinion on the subject:

DISCONTINUED THE SALE.—We carried Mixed Paints in a small way for some time, but two or three years ago some parties started in the Paint business exclusively a few doors from us. As they handled a much larger stock and better assortment than we could, we discontinued handling this line.

COLORS PROFITABLE.—There is money in Colors, but not in Lead, Oil and Turpentine. We only handle such Dry Colors and Oils as naturally belong to our mill supply department. Reliable house painters can buy their material direct from manufacturers who cater to this class of trade. The miserable painters to whom manufacturers will not sell run up a bill for a job with the Hardwareman, and it's cents to doughnuts if the merchant does not get stuck for the greater part of the bill.

CASH SALES ALMOST EXCLUSIVELY.—We have been selling Paints and Oils for the past three years, not pushing the line to any great extent, but find it profitable.

We sell almost exclusively for cash to property owners and manufacturing concerns, but not to painters.

KEEPING TAB ON THE PAINTERS.—We carry a large line of Paints of all kinds and of Oils. We sell to all classes of trade, including painters. The latter, as a rule, are an irresponsible set of men, but we keep a sharp watch on them, and when we find them drinking to excess we refuse to give them further credit. On an average about one painter a year sticks us to the extent of \$75 to \$100. This covers our entire loss on the Paint business.

Adelite.

Adelite is the suggestive name adopted for a Varnish and Paint Remover manufactured and prepared by the Adams & Elting Company of Chicago. Adelite is said to possess every quality of a perfect Varnish and Paint solvent, and when properly used removes Varnish, Paint, Shellac, Wax and similar coatings within a very short space of time. It contains no water, alkali or acids, and therefore does not injure the hands, and is free from objectionable odor. It finds a wide application in the refinishing of floors, furniture, pianos, beds, doors, store fronts, window sills and casings; in cars, steamships, machinery and carriages; in hotels, hospitals and sanitariums. It is especially commended as a satisfactory article in removing lettering from plate glass, and also for cleaning old paint and varnish brushes. It is also recommended as not softening glue nor raising the grain of the finest veneers, nor does it spot or injure the finest woods, and its effects need not be neutralized with soap and water, acids, &c. The liquid Varnish and Paint Remover is said to be especially adapted to flat surfaces and the semipaste to upright surfaces.

Wadsworth-Howland Company's New Plant.

Wadsworth-Howland Company, Chicago, Ill., who are manufacturers of a general line of Paints and Colors, dry and in oil, also Enamels, Stains, Varnishes, &c., have recently completed a new plant at Thirteenth and Indiana streets, in which they employ the most modern methods. The building is of brick construction, five stories in height, and equipped with mixers and grinders of modern type, which are operated by steam power; the building is also heated by steam and lighted by electricity. To facilitate the work of manufacturing the oil used is pumped to the top of the building into tanks, from which it runs by gravity into the mixers, which are located on the fifth floor. Both the Oil and the Dry Colors are proportioned by weight. From the mixing room the half prepared material is conducted by gravity into grinders on the fourth floor. The various tints and shades are prepared from formulae, the material again being proportioned by weight, the accuracy thus observed assuring the exact shade and the standard of the various prepared Colors. The recent introduction of machinery into the preparation of Color Cards has facilitated the production of these valuable aids in the sale of the product, which will be appreciated by painters and dealers alike; this department is also located on the fourth floor. In filling the barrels and kegs with Paint precaution is taken to keep intact the inside coating of the barrels, thus preventing leakage. On the third floor the Mixed Paints are put into tin packages of various weights and sizes. The laboratory and superintendent's office are also located on the third floor. The second floor is devoted to the printing of labels and stationery, and to the storage of raw material. The offices and shipping department are located on the first floor, which is also devoted to the storage of stock of the finished product. In the basement are located the boiler and engine rooms, and storage provided for large winter stocks. Varnishes and such other material of an inflammable nature are stored underneath the sidewalk and separated from the basement by iron doors to guard against fire.

COLUMBIAN FOUNDRY COMPANY, Brooklyn, N. Y., have been incorporated and will engage in the manufacture of Soil Pipe and Fittings in the former Harney Foundry at the foot of Eagle street, in that city.

NEW ENGLAND IRON AND HARDWARE ASSOCIATION.

THE regular monthly dinner of the New England Iron & Hardware Association was held at Young's Hotel, Boston, on Thursday, October 23, at 6 p.m., preceded by a reception. The attendance was unusually large for a monthly meeting owing to the presence of T. James Fernley, secretary-treasurer of the National Hardware Association, who spoke on "The Abuse of the Cash Discount System" as at present in vogue in the Hardware and kindred trades. After dinner President Oscar A. Shepard introduced Mr. Fernley, making suitable reference to an interesting event which happened in Mr. Fernley's family on the 22d inst.—namely, the birth of twin daughters. After acknowledging his increased responsibility and the congratulations of the association as offered through President Shepard, Mr. Fernley took up the subject of the evening, making the following address:

Address of T. James Fernley

I assure you that it affords me much pleasure to appear before you this evening as the official representative of the National Hardware Association of the United States, an organization which is honored by having such a number of representative New England houses on its membership roll.

I am somewhat embarrassed, however, because in appearing here I recognize that I am about to address a body of educated business men, and having had but limited opportunity in that direction, I am somewhat at a disadvantage. A few weeks ago, having occasion to attend the commencement of an institution of learning, I listened to a number of essays on subjects which could only be appreciated by a college bred man, and was feeling to a marked degree my literary littleness, when finally a young man was introduced to deliver the valedictory address in Latin. I said to myself, "Now I will listen carefully and may follow him to some extent, because the English language was largely taken from Latin." I had been enwrapped for several minutes when the young man stepped to the front of the stage and said, "Ignoramus." I said almost audibly, "I am it," and as soon as possible I left the presence of learned men.

After an experience of eight years in association work, I am convinced that a large part of the province of an association like yours and our own must be along educational lines. These are times which require a man to be a master of commerce in order to meet with success as a merchant. Your world renowned New England universities have been for many years educating young men for the various professions in which men obtain emolument, and yet until very recent years no effort has been made to educate our boys as merchants.

We realize that there is much knowledge of affairs commercial which the merchant of to-day does not possess, and hence associations of those engaged in various lines of trade have been formed, in the hope that by an interchanging of ideas the general knowledge of how to conduct business might be broadened.

THE SIGNS OF THE TIMES

point to great financial transactions in all branches of commerce. We must be prepared for the change. The merchant of to-day cannot conduct business as did the storekeeper of the last century. Figures which enter into all transactions to-day are gigantic.

The first bank of modern times was established at Venice, 500 years ago. This institute handled an amount of money which would be too small to justify the existence of a national bank in any sparsely settled community to-day.

At present the paper money in general use throughout the country amounts to upward of \$4,000,000,000, which does not more than equal the total amount of gold coin. Those who are in a position to know state that the banking money of the world is about \$13,000,000,000.

Why should not the great change in these transactions of business call for enlarged education in order to successfully handle such stupendous transactions as these data involve?

The Indians William Penn found on our shores needed little commercial training to carry on their exchange of commodities. It required little training for them to paddle a canoe, but who would decide to travel on an ocean steamer from your historic harbor with a captain who possessed only the knowledge of one who could paddle a canoe?

We would correct an erroneous impression which exists, fortunately to a limited extent, that associations of men in commerce are formed to regulate prices. We state without fear of successful contradiction that no association in the Hardware business has this object in view.

You are engaged in a business which requires the use of a large capital and the specific knowledge of the business conducted—a business which is pregnant with details and which requires constant and careful handling.

In nature there is a force known as vis inertia—the power of doing nothing. Can any man conduct an Iron, Metal or General Hardware business on the power obtained from vis inertia? You gentlemen know nothing of this force.

You are largely men of one idea. So have been the great men of history—they are remembered by the one idea which actuated their useful lives. Plato was a man of one idea, philosophy; Demosthenes, oratory; Paul, Christianity; Luther, the reformation; Watt, the steam engine; Fulton, the steamboat; Harvey, the circulation of the blood; Garibaldi, liberty; Shakespeare, the drama; the best lawyers have one idea; the best physicians, medical knowledge. You merchant princes one idea, mercantile success.

CONCENTRATION OF PURPOSE WITH DETERMINATION will succeed; it always has, and "history repeats itself," you know. Men with these traits are in demand. Determination is a quality which must always be in the possession of the successful merchant. Enthusiasm is also a quality which must be possessed by successful business men. Those who lack these qualities can be spared from commerce as readily as could the lady who was an ardent Methodist and was carried away by the oratorical flights of her pastor. She often disconcerted him with half audible ejaculations, such as "beautiful," "wonderful," "sublime." One Sabbath his imagination carried him so far into the sky that she could not follow him, and she exclaimed: "Oh, for one more feather in the wing of my imagination that I, too, might soar into these heavenly heights." The vexed pastor exclaimed: "Good Lord, give her the feather and let her go."

ABUSE OF CASH DISCOUNTS.

In accordance with your policy of educational advancement as merchants, you have come to consider a subject which is of utmost importance at this time, and without detaining you longer on generalities I will say that the abuse of the cash discount system is a subject which was first brought to the attention of the National Hardware Association in July, 1899, when the American Steel & Wire Company withdrew the cash discount entirely, substituting for it terms of "net cash 30 days." This they did at the time when the company in question absolutely controlled the products of the class they manufactured, and this action on their part was quickly followed by other manufacturers, who felt that if the concern in question could compel their customers to forego the cash discount they also could insist on a similar plan.

The secretary-treasurer of the National Hardware Association was instructed by the Executive Committee to vigorously protest against this curtailment of profit, and the machinery of the National Hardware Association was immediately put in motion to the end that the former terms should be restored. We found that one of the strongest arguments used by the manufacturers who had withdrawn the cash discount was that a large majority of their customers availed themselves of the cash discount, which they offered for ten-day payment, at the end of 15, 20 and in some cases 30 days, thus abusing the privilege of anticipating the payment of obligations. The further argument was pre-

sented by the manufacturers that the percentage was too much interest on the money in these days of cheap bank rates.

In answer to the first objection—viz., the abuse of the privilege—we were compelled to admit that the buyer was in the wrong, and it was not fair for the manufacturer to be compelled to give what we call a premium for anticipated payment when the payment was not in accordance with the terms on which the premium was offered.

In answer to the second objection—viz., that the rate was too large to pay for the money in the days of cheap bank rates—we stated that the cash discount should not be looked upon as interest on the money, but as a premium for placing money in the hands of the seller quickly after date of purchase.

After laboring with the manufacturers for a period of six months we induced a general return to the former terms, the American Steel & Wire Company first giving 1 per cent. for cash in 10 days and subsequently 2 per cent.

Before the concession was made we were asked whether we believed that the buyers and others would adhere strictly to the terms of the cash discount. We assured the manufacturers that this course would be pursued, and in talking with the manufacturers we are pleased to know that our assurances have been made good. To-day it is rather dangerous to take off the cash discount unless a remittance is made within 10 days from date of bill.

It has come to our notice within the last few months, however, that certain jobbing houses are not closely adhering to these terms in selling goods to their customers. We have heard of cases where the cash discount has been deducted at the end of 15, 20 and in some cases 30 days from the date of the bill and the deduction allowed. The evil is growing to such an extent that we feel that some concerted action must be taken on this subject. Were the profits of the business large it would not make so much difference, but when you consider that the average business house are fortunate if they turn their capital four times a year it is apparent that an amount equal to a dividend on the capital stock of the company would be lost if the cash discount is deducted and the cash not placed in the hands of the seller within a prescribed time.

The average merchant adheres strictly to the terms of selling and does not attempt to unjustly claim a premium for anticipated payment when he does not promptly remit in settlement of the bill within the prescribed time. It is unjust to this class that any exception should be made to the rule and hence we urge upon you the necessity of a strict adherence to terms.

Discussion.

At the close of Mr. Fernley's address expressions of opinion from prominent members of the various trades represented in the association were asked for and the following responded: William Chamberlain, Samuel A. Bigelow, C. D. Bragg, P. E. Strauss, G. W. Herrick, John H. Robbins, H. N. Lathrop, Charles Clark Adams, A. M. Wiley. The discussion was mainly confined to the comparison of experiences of the different concerns in handling the present discount systems and showed that there is a wide variance in the customs prevailing in the different branches of the trade, the metal section being the only one which had a minimum discount well lived up to and charged interest after 30 days. All agreed that the privilege of the cash discount was more or less abused by their customers, but the general sentiment appeared to be that united action at this time was impracticable owing to the different conditions in the various trades.

THE CHATTANOOGA STEEL ROOFING COMPANY, Chattanooga, Tenn., have changed their name to Chattanooga Mfg. & Foundry Company. As this company manufacture a large line of Sheet Metal Goods in addition to Steel Roofing, and also conduct a large foundry, it was felt that a more comprehensive name would be more in keeping with their business. No change whatever has taken place in proprietorship or management.

NOTES ON FOREIGN TRADE.

BRITISH LETTER.

Office of *The Iron Age*, HASTINGS HOUSE,
NORFOLK ST., LONDON, W. C., Oct. 18, 1902.

The State of Trade in Great Britain.

IT is sometimes wise to turn away from mere counting house reports, and to examine closely into the state of employment. By this means we are often able to glean fuller information than any merchant, no matter how well informed, can give us. The large wholesale men are generally able to indicate clearly enough what are the trade currents at any particular time, but they are fallible, and it is necessary occasionally to check their statements. For example, this week I was told by a merchant in a large way that trade was booming, that he had plenty of orders both on home account and export. On looking into the state of the labor market, however, I find ample confirmation of my previous forecasts that trade is on the decline. The official returns just to hand are to the effect that the general state of employment continues to decline, and is now not only worse than a year ago, but below the average for the month of September in the last ten years. The falling off is most marked in the shipbuilding and engineering trades. American demands have kept the miners of all sorts busy, but otherwise, judged by the state of employment, we are rapidly moving into a period of dullness. In 221 trade unions, with an aggregate membership of 553,870, 27,522, or 5 per cent., were reported as unemployed at the end of September, compared with 4.5 per cent. in August, and 3.7 per cent. in September, 1901. The mean percentage of unemployed returned at the end of September during the last ten years is 4.6 per cent. These figures should make any optimist pause. Turning more particularly to the Hardware trades, I find that employment in the brass trade is only moderate; in the brass and copper trades, good; in the Wire and metal branches, fairly good; in the Case Tube trade, fair; Fender and Fire Brass makers are quiet; makers of Household articles, Hollow Ware, Axles, Stoves, Ranges, Lamps, Heating Apparatus, Wrought Iron and Steel Hinges, Nuts and Bolts, Gas, Steam and water Tubes and general Iron work, report employment as good; makers of Bedsteads, light and heavy Steel Toys, Spades, Shovels, Cut and Wire Nails, machine made Rivets and nails, Iron and Tin Plate Goods, fair, and File cutters moderate. In the district of Sheffield in the Cutlery and Tool trades employment is reported as fair; in the Spring Knife industry and Saw making, as quiet; with Saw Handle makers, Handle and Scale cutters, File grinders, hand and machine cutters, as slack; with forgers of large Files, and in all other branches trade is but moderate. To the foregoing I must add a comment upon the Tin Plate trade. Employment there shows a slight decline, but continues good. At the end of September, 395 mills were working as compared with 402 at the end of August, and 378 a year ago. Fifty-two works with 257 mills had all their mills in operation at the end of September, while 26 others were partially at work with 138 mills working out of a total of 183. The number of work people engaged at the end of September is estimated at about 20,000. Of the total number of mills at work, 383, employing over 19,000 work people, were in South Wales, Monmouthshire and Gloucestershire, compared with 390 at the end of August and 364 a year ago. I have already given the exports of Tin Plates, and need not now repeat them. Latest cables to hand from America with reference to the Tin Plate industry there are having a disquieting effect upon trade here.

The Lock Trade Dispute.

A well informed correspondent in the Midlands gives some useful information about the Lock strike, the development of which I have already reported. Referring to a meeting of the Willenhall Lock makers held this week, he says that about 30 were present, all the leading firms in the town being represented. Reporters were not admitted, but it is stated on most reliable authority that

the attitude of the employers was one of great firmness, and the demand for an advance of 10 per cent. in wages will be resisted to the utmost. The reasons assigned for this decision are that the wages of the locksmiths are ample for the work done and the skill required, and that any advance would involve a raising of the price of Locks, which would be most prejudicial to the trade. It is asserted that any locksmith who is steady and attentive to his work can easily earn 30 shillings per week of 50 hours, and those possessing real mechanical skill can easily earn 35 to 40 shillings per week. In proof of this several of the leading firms are allowing independent persons who have no personal interest in the dispute to examine their wages books.

The Development of Burma.

India has often occupied considerable space in this British letter, but hitherto I have said nothing about Burma. As both India and Burma are under the same Government, their interests are, to some extent, the same. But in view of the proposed removal of likin stations in China, Burma instantly assumes an important commercial position, because of its access to South-western China, a portion of that great country which has yet to be developed, and which is distinctly of great potential wealth. Of course, everything hinges upon the ratification of the treaty. The continuation of the old conditions means a severe check upon Burmese trade. For example, between Tengyueh and Yunnan-fu on the main trade route from Bahmo, there are no less than 20 likin stations. The abolition of these under the new treaty, it is considered certain, would give great impulse to the import trade from Burma. As a matter of fact, apart from the advantages which would accrue under the new treaty the trade between Burma and Western China has developed very rapidly during the last three years, imports being over 100 per cent. and exports 52 per cent. greater than in the previous triennial period. This trade is largely in soft goods, but it is an axiom that Hardware follows soft goods in due course. In addition, Burma has rich Oil fields, and the Standard Oil Trust has already sent a representative thither to make arrangements for its working. There are many difficulties more of a political nature which stand in the way of commercial prosperity. Upper Burmah has been the scene of a long guerilla warfare, called "dacoity." This is now at an end, and the country is being opened up for agricultural settlement and the development of village trades. It is stated that the present railway system is a disgrace, both for lack of rolling stock and for enterprise. The railways are in the hands of the Government, and unfavorable comparisons are drawn between the methods of the railway administration with that of the Irrawadi Flotilla Company, who have upon the river the finest fleet of internal communication in the world. The whole of the East African carrying trade is, owing to the shipping combine, left in the hands of the German companies. These companies are keen competitors with British shipping companies, both at Rangoon and Mandalay, while the village trade is more and more in the hands of the Chinese middleman, who generally proclaims himself, "Johnny, British subject, me come from Hong Kong." I advise exporters to keep their eye upon Rangoon, the Irrawadi, and both Upper and Lower Burma, for trade will be done there in the future which will surprise people.

Trade in Southern Russia.

I reported some months ago that the harvesting prospects in Southern Russia were distinctly favorable. It has so proved, and with it has come a strong demand for agricultural machinery. From a report to hand I gather that the United Kingdom has taken her share of the trade, though certain classes of machines seem no longer to be sold. For instance, Harvesters are not now supplied by British firms; 30 years ago they were sold by British firms, and were so well made that many are still in use, as is shown by the annual demand for renewable parts. But British Harvesters are made for big English horses, and are too heavy for the much smaller horses and bullocks used in Russia. Manufacturers in the United States have put on the market

a much lighter machine which has displaced the British production. German firms supply many kinds of machines. They give longer credit and sell more cheaply than British firms. I merely mention this as a fact, not as an example necessarily to be followed, for German firms who are overaccommodating often experience losses which are avoided by business men who are less eager to do business at any price. The German supply of these machines has sprung up in the last few years. German machines are now being tested by time, and British manufacturers have no need to dread the competition. Many purchasers of German machinery have also bought the knowledge that true economy is best served by buying a really good article. Among articles imported into Odessa during the past year I note the following, together with their tonnage:

Articles.	Quantity. Tons.
Sheet Iron.....	12,230
Wrought Iron.....	1,390
Tin.....	538
Tinware.....	362
Reapers.....	856
Cast Iron.....	470
Scythes, Spades, Shovels, &c.....	332
Machines.....	1,112

A point of interest to Americans is whether or not the Russo-German commercial treaty of 1894 is to be continued. The treaty stands until the end of 1903. If either side notifies an intention 12 months before this date to terminate it, it then naturally comes to an end. Failing such notice, it remains in force, terminable by either side at 12 months' notice. At the time of writing I confess I am not clear what is the present political position between Russia and America, but some comments upon how the termination of this treaty would affect Great Britain carry their own lesson, and with that I leave the subject:

"If the German treaty comes to an end the tariff which is contained in it ceases to be a conventional tariff, and becomes liable to change at the discretion of the Russian Government. This may be of serious importance to British traders, who, by virtue of the 'most favored nation' clause in the British commercial treaty, enjoy the reduced rates of the German treaty; but even if the present tariff for treaty nations is modified British traders will, in some respects, be protected by the tariff in the French commercial treaty, which, though not as favorable or comprehensive as that in the German treaty, is still, for many articles, better than the general tariff. The principal articles of British production admitted at present under the German tariff, which do not appear in the French tariff, are (roughly speaking) Joiners' and Turners' Goods, Iron unworked, Rails, Sheets, Plated Sheets, Steel (in Bars, Pigs, Rails, Sheet and other forms), Tin, Lead, Wire (Iron, Steel, Copper), Cutlery, certain kinds of machines, &c."

Spurious German Wire Nails.

The *Ironmonger* of October 18 makes public a statement of importance which should be known at once by American exporters interested in Wire Nails. It is to the effect that for some time past in the German Wire Nail trade underselling has been prevalent. It is common knowledge that the whole of the 94 associated German works, with an aggregate output of 220,000 tons of Wire Nails a year, put their selling agency into the hands of one agent over here, whose duty it is to supply the various wholesale dealers, who, in their turn, sell to customers. It now comes to light that these so-called German Wire Nails, which have lately been sold at from 10 to 15 shillings a ton below the price of the genuine German article, are really not of German manufacture at all, but are made in Holland. The German Wire Nail Association have, after much trouble, succeeded in tracing the parties concerned in these spurious transactions, with the result that three consignments of Nails have been seized on reaching this country. The goods are packed in bags marked "made in Germany," and their quality is stated to be distinctly inferior to that of the real German article; indeed, the suspicions of the German syndicate were first aroused on account of the complaints addressed to them regarding the bad quality of the Nails. The syndicate are taking prompt measures to put a stop to these counterfeit importations by set-

ting a special watch upon every shipment of such material from Continental ports.

GERMAN HARDWARE NOTES.

BY A SPECIAL CORRESPONDENT.

THE Philadelphia Lawn Mowers are largely imitated, although the American work is better.

Chimney tops to prevent smoky chimneys are quite salable; those of conical type could be shipped in two parts, all of the lower part slipped together and the tops similarly "nested;" the local agent here could put them together. The freight could then be kept down to a minimum. Floor and other Brushes with cocoa fibers, instead of bristles, sell well. As for Iron Legged Chairs and Tables, which are used by the hundred thousand in the big cities, I think that with your facilities for casting the iron parts could be sent over in competition with the native, and perhaps the seats and tops could be shipped independently. Batches of a dozen sets of legs or stands, with the complementary seats or tops, and the screws therefor, all ready to be put together, could be shipped, the whole all ready painted some standard color—as brown for the seat and tops and green for the legs—and could be sent direct to the customers, they being big beer garden proprietors, without bothering any middlemen except a distributing agent at Bremen or Hamburg, whose only duty would be to receive carload shipments from the vessel and divide them up according to the orders. But one size of each article would be necessary.

There are so many things, sealed with lead seals, for transportation from one country through another to still another, that these Seals and the necessary Hand Seal Presses to apply and stamp them would be a good thing to make a "try" on.

Clothes Wringers are getting quite common; the best have the upper roll so arranged that it may be laid back away from the under one.

The household Bathtub is by no means general, and where one finds it it is almost without exception supplied with its own gas or other heater, quite independent of the house pipes, except as far as the supply of cold water is concerned. I think that a good, practical rig for petroleum would throw the present local affairs out of the market.

Sheet iron Stove Pipes are only just commencing to come into use, as the tile stove built into the house is being displaced but slowly by the Reservoir and other cast iron Stoves that can be taken out in summer. But as yet the market has room for good special Shears to cut the Pipe, through seam and all.

The Hammer with an iron wedge running down from the eye into the handle has just made its appearance as a great novelty; the only difference between the German and the American is that the former has a ring around the handle where the wedge terminates, and there is only one pin through the handle at this point.

Zinc faced Washboards with corrugations that are waved in the direction of their own length—that is, across the board—are now getting a good reception.

The Germans have better File Handles than the Americans produce. The best have very wide ferrules; some have not only the usual band ferrule, but also a wire wound one. Many are made of paper and similar composition.

NEW ENGLAND ENAMELING COMPANY.

NEW ENGLAND ENAMELING COMPANY is the name of a recently incorporated company, organized to manufacture double coated Enameled Steel Wares for cooking and house furnishing uses. We are advised by the company's president, Aaron Hecht, that they have just begun to produce goods, and are now in a position to execute orders. Their plant, building, machinery and equipment are entirely new. The factory, 450 x 150 feet, part of which is three stories high and part one story, is located at Middletown, Conn. In New York they will be represented by H. Ginsburg, 61 Beekman street, selling agent, who was formerly with the National Enameling & Stamping Company.

LEE-GLASS-ANDREESSEN HARDWARE COMPANY'S CATALOGUE.

THE LEE-GLASS-ANDREESSEN HARDWARE COMPANY of Omaha, Neb., issue a very complete catalogue of 1188 pages. As a frontispiece a view is given of the company's large and finely appointed building, corner of Ninth and Harney streets, which is supplied with modern devices for the rapid and economical conduct of business. The catalogue is divided into the following departments:

Builders' Hardware.
Tools and Farming Implements.
Miscellaneous Hardware.
Tinware and kindred goods.
Cutlery.
Guns, Ammunition, Fishing Tackle and Miscellaneous Sporting Goods.
Valuable Information.
The Western Freight Classification.

There is also an index covering 23 pages. The last two departments include information relative to prices, weights and important facts regarding freight classification and class rate on each item in the catalogue. On goods not having a manufacturer's number or list a system of numbering has been applied to facilitate ordering and to avoid errors. List prices have been made on this class of goods to show comparative values. The company are to be congratulated upon the make up of the catalogue, which will doubtless be highly valued by their patrons.

A. H. FUNKE'S NEW QUARTERS.

A. H. Funke, who since the fire in the Boker Building, 101 to 103 Duane street, New York, last spring, has been occupying temporary quarters opposite, at 94 Duane street, is now permanently located at 325 Broadway, near Worth street. He has the entire second floor, reached by a passenger elevator in front. This large and commodious floor is divided by a partition, the front portion being fitted up for office and salesroom purposes, while the rear is arranged to accommodate stock of goods. Mr. Funke is sole agent in the United States and Canada for the entire product of a large Belgian Shotgun factory in Liège. He is also the direct representative in this country of C. G. Haenel, Suhl, Germany, maker of the celebrated Mannlicher Rifle. He is the sole agent for the Kelecom Motors for automobiles, and a large and fine line of Automobile Horns, the latter being operated by pressing a rubber bulb. There are upward of 30 different sizes and styles of Horns, some of which are operated by means of a foot rest, others having a double action, giving two sounds with one pressure of the bulb. Mr. Funke is also manufacturer of the Baldwin Acetylene Lamps for bicycles, yachts, automobiles and mining purposes, together with Search Lights for yachts, &c.

THE WOOD SHOVEL & TOOL COMPANY.

THE WOOD SHOVEL & TOOL COMPANY, Piqua, Ohio, announce the completion of their plant, the erection of which was begun last June. The factory, which is of brick and wood construction, is 50 x 260 feet, divided into the following departments: Welding, pickling, finishing, grinding, labeling, steel room and warehouse. The plant is equipped with the most modern machinery, the installation of which gives the factory a capacity of 1000 dozen per week. Both high and low grade goods will be manufactured, including plain back, hollow back and Maynard pattern Shovels, Spades, Scoops and Draining Tools. A considerable stock of raw material to be used in the manufacture, including 20,000 handles and 1000 tons of steel, has been procured and the plant will be in active operation on or before December 1. Private spur tracks connect the works with the Pennsylvania Railway system, insuring excellent shipping facilities. The officers of the company are H. K. Wood, president; S. S. Gould, vice-president, and W. W. Wood, secretary and treasurer. The sales department will be under the personal supervision of Vice-President Gould, who will probably make his home at Piqua.

CORBIN CABINET LOCK COMPANY'S KEY CATALOGUE.

CORBIN CABINET LOCK COMPANY, New Britain, Conn., and 11-15 Murray street, New York, have just issued a very complete illustrated catalogue of Keys, Key Blanks and Key Checks in great variety, there being 198 pages in all, with from 5 to 40 illustrations per page, according to size, all engravings showing the Key actual size with a cross section end view directly beneath each cut. In the front is a numerical list in consecutive order for convenient reference, giving number of each Key or Blank, with page and list price, in addition to the lists printed on each page. There is also one page on which are listed 101 different Key assortments in different combinations, especially suitable for locksmiths and repair work.

PRICE-LISTS, CIRCULARS, &c.

THE J. STEVENS ARMS & TOOL COMPANY, Chicopee Falls, Mass., the Stevens-Duryea Two-Cylinder Gasoline Carriage. An illustrated pamphlet describes the motor and construction of the carriage, capability for speed, hill climbing, &c., finish and equipment.

THE WHITMAN & BARNES MFG. COMPANY, St. Catharines, Ont.: Canadian catalogue of Mower Knives, Harvester Sickles, Mower and Reaper Sections, Twist Drills, Wrenches, Spring Keys and Cutters, &c.

CREAMERY PACKAGE MFG. COMPANY, 1-5 West Washington street, Chicago, Ill.: Special export catalogue of Creamery Cheese Factory, Dairy and Milk Dealers' Apparatus and Supplies.

THE DIAMOND SHEAR COMPANY, Wilmington, Del.: Catalogue and price-list relating to Sheep, Horse, Mule, Grass, Hedge, Border and Pruning Shears. This business was established a year ago, and the company claim that their Shears are equal to the best foreign makes as to quality, shape and finish, while they are being offered at prices materially below those of the foreign article. The company also manufacture the Lawton One-Piece Steel Plate Hatchets.

THE MILTON MFG. COMPANY, Milton, Pa.: Illustrated catalogue and price-list relating to Cold Punched and Hot Pressed Nuts and Wrought Iron Plate Washers. The company make Steel or Iron Forgings for shafting, crank shafts, &c., also Special Forgings to order.

THE SOUTHERN PLOW COMPANY, Columbus, Ga.: Illustrated catalogue of Plows, Cultivators, Harrows, Cotton Scrapers and Planters, Syrup Kettles, Dog Irons, Cane Mills, Shoe Lasts, &c.

THE WIARD PLOW COMPANY, Batavia, N. Y.: Twenty-eighth annual illustrated catalogue of Implements. These include Walking and Sulky Plows, Weeders, Harvesters, Hand Corn Planters, Cast Iron Chimney Caps, &c.

THE BECKLEY-RALSTON COMPANY, 178 Lake street, Chicago, Ill.: Annual catalogue No. 26, devoted to Standard Bicycle Material and Sundries, Bicycles, Machinists' Tools, Gasoline Gas Lamps, Automobile Supplies, Tubular Runabout Gears, Hardware, Specialties, &c.

THE INDIANA CHAIN WORKS, Jeffersonville, Ind.: Chains. An illustrated catalogue shows an extensive line of Coil, Wagon, Harness, Trace and Railroad Chains, Cow Ties, Repair Links, Rings, &c.

THE ILLINOIS SCREW COMPANY, 40 South Canal street, Chicago, Ill.: Catalogue devoted to Set, Cap and Collar Screws, Studs; Coupling, Planer and Patch Bolts; Machine Screws, Nuts, Taps, &c.

QUEEN ANNE SCREEN COMPANY, Burlington, Vt.: Illustrated catalogue of Screen Doors and Window Screens in a large variety of styles and sizes.

INTERNATIONAL SILVER COMPANY, successors to the Rogers & Hamilton Company, Waterbury, Conn.: Catalogue devoted to Artistic Plated Ware, Knives, Forks and Spoons. A special feature of the Rogers & Hamilton brand is that all Spoons and Forks are plated an extra thick coat of silver on parts most exposed to wear by sectional process. It is explained that this process makes an extra plate more than triple, XII or double

plate more than quadruple, and triple plate more than sextuple. The company issue a small leaflet regarding sectional plating.

CHAS. L. BASTIAN MFG. COMPANY, 76-78 Illinois street, Chicago, Ill.: Catalogue A illustrates Bottling Machinery and Supplies for soda and mineral water bottlers and dispensers. The company are also Brass Founders and Finishers and Silver and Nickel Platers.

GARDNER SASH BALANCE COMPANY, 312 First National Bank Building, Chicago, Ill.: An architect's edition of illustrated catalogue relates to Gardner Ball Bearing Sash Pulleys for ribbon, chain and rope, Steel Sash Ribbons, Ribbon Attachments, Ventilating Sash Bolts, Steel Door Fasteners and Steel Sash Locks.

THE DUFF MFG. COMPANY, Allegheny, Pa.: Barrett Jacks. Catalogue C illustrates and describes Compound Lever, Track, Automatic Lowering, Car Box and Oil Well Jacks, Differential Screw Jacks, &c.

THE JANESVILLE MACHINE COMPANY, Janesville, Wis.: Modern Implements. Catalogue No. 43 describes, with prices, Weeders, Plows, Disk Plows, Listers, Lever Harrows, Cultivators, Seeders, Mowers, Barrel Carts, &c.

FREDERICK SHAPLEY & Co., 246 Front street, New York: Shapley's United States Marine Glue. A circular describes the Glue as absolutely water proof, firm under heat, flexible under cold, plastic and adhesive.

THE CARROLL IRON WORKS, Chicago, Ill.: Illustrated catalogue devoted to Wind Mills, Towers, Pumps, Tanks, Pipe and Fittings and Well Supplies.

MILLERSBURG FIFTH WHEEL COMPANY, Millersburg, Pa.: Fifth Wheel. The company manufacture this class of goods exclusively. In their catalogue they state that they use only high grades of iron, manipulated by improved methods and machinery.

SAMUEL HARRIS & Co., 23-25 South Clinton street, Chicago, Ill.: Tools and Supplies for machinists and manufacturers, including Harris' Lathe Dogs, Hack Saws, Wrenches, Malleable Iron Ladles, Small Engine Castings, Governor Castings, &c.

CONTINENTAL TOOL COMPANY.

CONTINENTAL TOOL COMPANY, Frankfort, N. Y., have just issued an attractive catalogue of 78 pages, showing their complete line of Forks, Hoes, Rakes, &c. They refer to the quality and finish of their products as bearing comparison with those of any other manufacturer, and state that, although they did not announce their prices until October 2, they have been obliged to withdraw their salesmen from the road and to decline to make quotations upon many of their lines, on which they are already sold up for the coming season. The company advise us that they are intending to largely increase their capital stock and manufacturing facilities. In view of their location as regards export business, the company will during the coming year seek an avenue through foreign markets for any surplus stock. The catalogue is accompanied by a discount sheet.

WARREN D. ROLLINS, resident and managing partner in London of the house of John G. Rollins & Sons, exporters of American manufactured goods, New York office 15 Whitehall street, arrived here from England October 11 and expects to return about November 25. While here he will make a trip to manufacturing centers in the West with a view to taking on the representation of some additional lines suitable for the trade of the United Kingdom in the way of Hardware and kindred manufactures of metal, wood, &c. Their London office, at 124 Holborn, London, E. C., has 2000 square feet of floor space for the display of samples. Their branch in Liverpool is at 12 Lancelot's Hey.

A MOVEMENT is on foot looking to the consolidation of several Hardware houses in Western Pennsylvania, but nothing definite has thus far been accomplished. A meeting will be held on Friday, when it is anticipated action will be taken looking to the determination of the matter one way or another.

THE DECLINE IN SHOVELS.

The following facetious communication in regard to the Shovel situation is from a manufacturer who forbids the use of his name:

You ask what we know about Shovels and the policy and prices. We do not know a thing, but, say, did you ever hear the story of Coal Oil Johnny and Major Teagle? Along late in the 60's Coal Oil Johnny was a great man; he had money to burn and he burned it, but of course he reached the end of his rope. Major Teagle was a partly bleached American citizen. Besides being major of the Colored Guards' Own he was a tonsorial artist of repute. Johnny employed the Major as valet and the Major stuck to Johnny as long as Johnny had any money. The writer was returning from New York City to Philadelphia upon one occasion, and, passing through the train with some friends, saw a very familiar figure sitting upon the car steps. We called to him, "Hello, Coal Oil Johnny!" He turned up his yellow face and grinned and said: "I ain't no Coal Oil Johnny, but I got some of Johnny's money."

AMERICAN TAP & DIE COMPANY.

AMERICAN TAP & DIE COMPANY, Greenfield, Mass., have been incorporated with a paid up capital stock of \$10,000, for the manufacture of Screw Plates, Taps, Dies and other Hardware specialties. The officers are: President, Edward Wilbur; treasurer, Walter E. Nichols; clerk, Nathan E. Martin; directors, Edward Wilbur, Walter E. Nichols, Dr. Thomas F. Fyfe, J. Henry Nichols and J. P. Logan. The company expect to begin business about November 1. They also have several newly patented specialties that they will put upon the market in the near future. Nathan E. Martin, the superintendent, is an expert Tap and Die maker, and was for 21 years in the employ of the Wiley & Russell Mfg. Company. Edward Wilbur was for seven years treasurer and business manager of the E. F. Reece Company. W. E. and J. H. Nichols have been known to the Hardware trade for many years as manufacturers of the Nichols Bros.' Butchers' Tools and Cutlery. The new company expect to build a modern factory specially adapted to their business next spring.

AMONG THE HARDWARE TRADE.

L. A. Gnam has disposed of an interest in the Hardware business in Carroll, Iowa, to his brother, and the firm style will be changed to Gnam Bros. in the near future.

V. T. Ward's Hardware store in Cheney, Wash., was robbed of a number of Revolvers on the 3d inst.

Finch & Wing are successors to J. L. Smith in the Hardware, Stove, Tinware and Sporting Goods business in Ipswich, S. D.

G. Cox has disposed of his Hardware business in Waldron, Ark., to Garrison Hardware Company, who continue at the old stand.

W. W. Corkin & Son have sold their Hardware, Farm Machinery and Wagon and Buggy business in Fulton, S. D., to A. D. Fosburg.

D. A. Puddleford has succeeded D. A. Puddleford & Son in the Hardware and Agricultural Implement business in Coleman, Texas.

Behnken Bros. have opened up in business at Lindstrom, Minn., carrying a line embracing Shelf and Heavy Hardware, Stoves and Tinware, Sporting Goods, &c.

The store of the Cripple Creek Mine & Supply Company, Cripple Creek, Col., was robbed a short time since of about \$200 worth of Guns, Razors and Knives.

O. H. Schultz, Hardware and Stove dealer, Wahpeton, N. D., who purchased H. L. Eastman's business last February and has since materially increased the stock carried, has commenced work on a new building, which will be 132 feet long by 25 feet wide, two stories. It will be equipped with freight elevator, steam heat and electric light. The second floor will be devoted to tin shop and storage. The cost of the building will be about \$10,000.

The Thompson & Roell Hardware Company, Owatonna, Minn., were incorporated October 1 with a capital of \$50,000. John W. Thompson is president, and John A. Roell, vice-president. The new concern succeed the Nelson & Bouquet Hardware Company and the J. W. Thompson Hardware Company, both of Owatonna. The company will handle at wholesale a line embracing Shelf and Heavy Hardware, Stoves and Tinware, Agricultural Implements and Sporting Goods, Paints, Oils, Harness, &c. The company are building two new warehouses, which will be 25 x 100 feet in dimensions. Mr. Thompson has been connected for the past 25 years with the Simmons Hardware Company, and Mr. Roell has been in the retail Hardware business in Northfield, Minn., which he sold out a short time since.

Bishop & Anderson have sold their Hardware, Stove and Sporting Goods business in Blue Earth, Minn., to Maxson & Hale Hardware Company, who continue at the old stand.

Chas. P. McCoon, Hardware merchant, Wabash, Ind., has sold his business to W. J. Creighton, who will continue at 60 Wabash street, as heretofore.

Hugh M. Quinn, Hardware merchant, Mapleton, Minn., has purchased the business of J. M. Sprague, and will combine the two stocks.

The Hoppe-Taylor Hardware Company, Chillicothe, Mo., have been succeeded by W. H. Archer & Son.

MISCELLANEOUS NOTES.

A New Winchester Cartridge.

The great success which the .22 long and .22 short smokeless powder cartridges loaded by the Winchester Repeating Arms Company, New Haven, Conn., with the new Winchester greaseless bullet have met with has led them to offer the .22 Winchester rim fire cartridge, sometimes known as the .22-7-45, loaded with smokeless powder and Winchester greaseless bullets. The company are now prepared to furnish these cartridges to the trade.

Imperial Coffee Mill No. 705.

The Imperial coffee mill No. 705, manufactured by the Arcade Mfg. Company, Freeport, Ill., is provided with a sunken hopper and improved grinding burrs. The top is of iron, with hinge cover and top handle. The box is of hard wood with dovetailed corners, polished and varnished. The iron parts are finished with bronze lacquer. The size of the mill is 6 x 6 x 5 inches.

Hack Saw Blades and Frames.

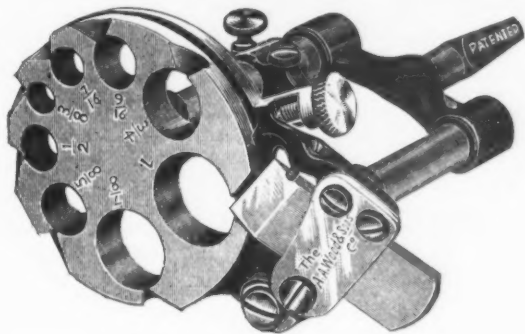
E. C. Atkins & Co., Indianapolis, Ind., are putting out new hack saw blades which are manufactured by a process whereby the tooth edge only is left hard, while the back is drawn to a clock spring temper, which will permit the saw to bend without kinking or breaking under ordinary strains. They also manufacture two other styles of hand hack saw blades: the flexible or soft back saw and the hard blade, both of which are fitted with regular or fine teeth, and one style of power blade tempered hard and fitted with regular and special teeth. Hack saw frames are manufactured in three designs: An extension frame made of high grade steel heavily nicked and finely polished; a solid steel adjustable pattern all nicked and polished, and an iron frame black japanned and with black wood handles.

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Wood's Hollow Auger No. C1.

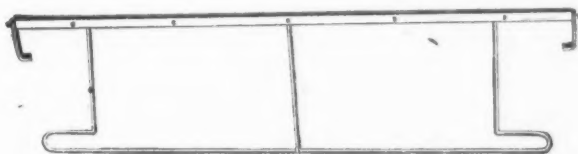
Illustrated herewith is a hollow auger put on the market by A. A. Wood & Sons Company, Atlanta, Ga. The tool is of the type known as the "Bonney" auger, and cuts tenons of eight sizes, from $\frac{3}{8}$ to $\frac{1}{2}$ inch, by sixteenths, and from $\frac{3}{4}$ to 1 inch, by eighths. In adjusting the auger no tool is required, and in changing from one hole to another the knife is not loosened from its socket. When the knife is once set for one hole it is in proper position for all of the holes. The setting of the auger is accomplished by means of the largest thumb screw shown in the cut. To alter the setting from one hole to another it is only necessary slightly to withdraw

*Wood's Hollow Auger No. C1.*

the thumb screw, to turn the disk to the desired point and to tighten the thumb screw again; then the tool is set and ready for use. The auger is referred to by the makers as being finely finished, and especial emphasis is laid upon the ease and quickness of adjustment without the use of tools and upon its simplicity, durability and accuracy. The auger will be ready for the market about November 10, and the manufacturers will be pleased, in the meantime, to quote prices to the trade.

The Perfect Pillow Sham Holder.

The accompanying cut represents a pillow sham holder offered by the Perfect Goods Mfg. Company, Franklinville, N. Y. The device holds single or double

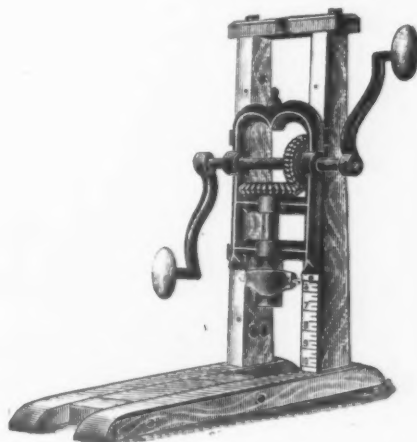
*The Perfect Pillow Sham Holder.*

pillow shams, which are attached by running either a common pin or a safety pin through small staples. It fits any bed from 3 feet 6 inches to 5 feet wide. The following are mentioned among the points of excellence: The holder is light, strong, simple, attractive, easy to work and holds the pillow shams in proper position when down, and when raised they are securely held back; and it will not mar the finest bedsteads, as it fastens to the back side of the head board. The holder is made of wood, prettily stained and trimmed with copper trimmings. It weighs but 11 ounces, and is intended to retail at 10 cents.

Improved Auger Spindle Boring Machine

The Keillogg Mfg. Company, Troy, N. Y., are offering their boring machines with improved auger spindle, as shown in the accompanying cut. The advantage of this spindle lies in the fact that a carpenter using the improved machine can use in it any ordinary auger bit he may have, not being obliged to buy boring machine augers for it. To provide for the use of different sized square and round shank bits the hub of the spindle is provided with a perpendicular round hole large enough to take in the different shanks. When a brace bit, which

has a square end shank, is used, the square part enters a chamber above the round hole, so that the round part of it is free to be clamped. The clamping is done by

*Improved Auger Spindle Boring Machine.*

means of movable steel jaws within the hub of the spindle, adjustable by two set screws, one at each end of the hub.

The Never Fail Oil Can.

In the accompanying illustration is shown the Never Fail oil can, made by the J. A. Harps Mfg. Company, Greenfield, Ohio. The can is made of the best quality of No. 27 Apollo bloom galvanized iron and neatly painted, striped and labeled. It is so constructed that no funnel is required, there is no slop or drip and no

*The Never Fail Oil Can.*

sucker, piston or air valves, no opportunity for evaporation, and the pump being on the top of the can never comes in contact with the oil. The oil is drawn from the can by means of air pressure through the operation of a small pump or air compressor placed on the top. It is claimed that this works very easily and will pump a gallon of oil a minute and take all of the oil out of the can. When filling lamps oil may be run from the lamp back into the can, in case the lamp becomes too full.

Dufendach Hardware Company, Huntingburg, Ind., have purchased a building which they will remodel for the purpose of accommodating their business. The building is 42 x 85 feet, two stories. A new plate glass front will be put in, with metal ceiling, the most approved shelf boxes and store fixtures, &c.

Stevens' Double Barrel Shotgun.

The J. Stevens Arms & Tool Company, Chicopee Falls, Mass., have just placed on the market the gun herewith illustrated. It has smokeless steel barrels, reinforced breech, with frame and parts drop forged. It has matted extension rib, top lever, treble bolt, low circular hammers, rebounding bar locks with steel works and

nearly over the center of the apple. This arrangement is to insure having all sized apples peeled equally well, as the knife maintains its proper position. The turn table is carefully fitted with long bearing upon the stud. All important adjustments through the parer are by slots at right angles, giving double adjustment in any direction. All castings are the best obtainable, and made from carefully prepared patterns. Many of the



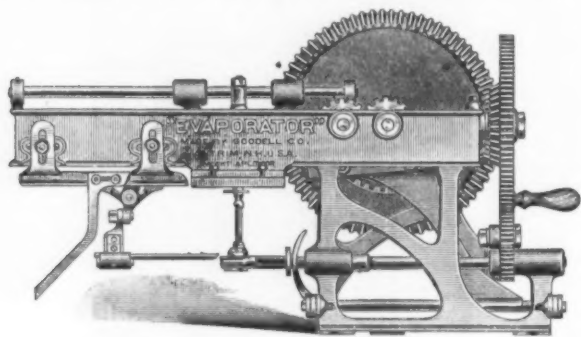
Stevens' Double Barrel Shotgun.

solid plungers. It is provided with patent fore end checkered, checkered pistol grip, rubber cap and rubber butt plate. The barrels are choke bored and especially designed for smokeless powders. The gun is machine made throughout and all parts are interchangeable. It weighs about 7½ pounds, and at present is made in 12 gauge and 30-inch barrels only.

The Evaporator Hand Apple Parer.

The accompanying cut represents an evaporator hand apple parer put on the market by the Goodell Company, Antrim, N. H., New York office 10 Warren street. The frame of the parer is made of one solid box casting, permitting the driving shafts to run in long bearings in the frame with driving gears fast upon them. The bearings are over 8 inches long. A positive rack and pinion "in gear" is used at every point to make it impossible for the knife to jump by. All gears are of standard tooth and as

principal working pieces are steel castings, all screws and nuts are well proportioned, and when necessary are hardened. Means are provided for quickly attaching to and removing from a table or bench without the use of any tool, and when in position the parer is firmly and securely anchored. Oil holes are of good size, easily accessible and covered with self closing cups. The parer is referred to as being constructed on scientific principles, the finish and general appearance being of the best. In case of breakage parts may be ordered, which, it is remarked, are sure to fit exactly with no work whatever upon them when received.

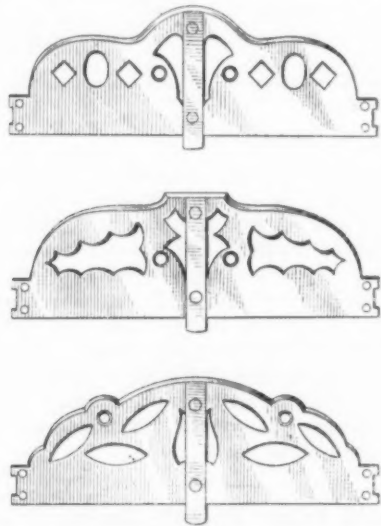


The Evaporator Hand Apple Parer.

coarse pitch as is practical, to secure long wear and small friction. The crank is attached by a large cap screw adjustably locked in any position. Perfect rigidity of carriage is secured by long distance between guiding points and the use of a lower foot guide with milled groove traveling upon a ½-inch shaft adjustable in all directions. This is to give a truly parallel and easy motion. Cold rolled solid steel shafts are used, running in solid cast iron bearings of ample length. The fork spindle is solid, and by a patented device performs its work without the pushing off rod extending through the fork spindle. This is to permit the attachment of the spindle gear to a solid shaft, so that it cannot slip; also putting the rear spindle bearing at the extreme end, outside the gear, to relieve the spindle of all strain or tendency to spring. The form of the frame enables the corner bracket to be made with four widely separated bearing points, to guard against all lateral or vertical motion, and avoiding split apples. The four bearing surfaces are accurately machined and the bracket is hung on a long hinge bearing. The turn table and knife bar swing completely under the carriage upon a long steel stud, the point at which the knife bar is hung being

New End Plates for Carpet Sweepers.

The National Sweeper Company, Marion, Ind., have designed and are manufacturing new end plates, which are being used on their carpet sweepers for the fall trade. Heretofore these end plates have been malleable iron castings. The new plates are stamped from heavy gauge cold rolled steel, thus contributing greater strength with lighter weight as more desirable on a carpet sweeper. The smooth surface of the steel also allows a higher grade of nickel plating. While the designs of the plate are neat their appearance is enhanced by the furniture protector which is placed around them.



New End Plates for Carpet Sweepers.

The notches in the ends of the plate serve to hold the furniture protector in place, and the round head screws which are used to fasten the plates to the sweeper give an additional support to the protector. The middle design in the accompanying illustration is used on the Marion sweeper, that at the bottom on the Marion Queen and the one at the top on the Royal Duchess and Sterling sweepers.

The Adelite Varnish and Paint Remover Wheel Tank.

The Adams & Elting Company, Chicago, Ill., have designed a convenient wheel tank for use in the removal of varnish and paint from wheels by the application of Adelite, as shown in Fig. 1. This is a preparation by which paint and varnish are removed clean to the wood

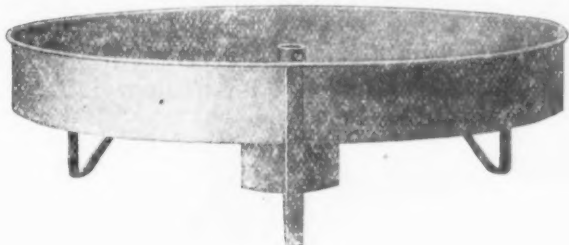


Fig. 1.—The Adelite Varnish and Paint Remover Wheel Tank.

after a short time, varying according to the number of coats and the quantity of varnish on the wheel. The wheel is placed in the tank as in Fig. 2, and the tank is filled with the remover. The manufacturers state that this plan reduces the cost of refinishing wagons and carriages more than one-half. It is also stated that the preparation contains no acids, alkalies, fusel oil or wa-

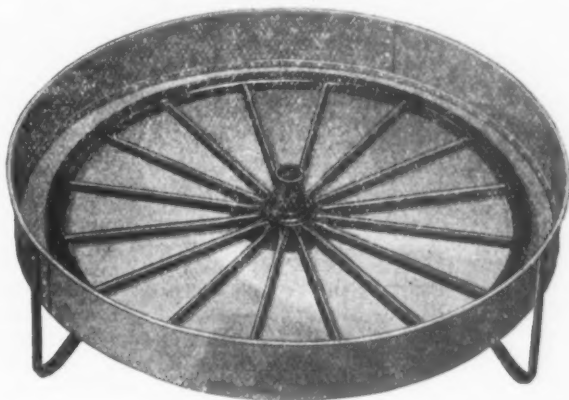


Fig. 2.—Wheel in Adelite Varnish and Paint Remover Tank.

ter; that it does not injure the hands or the finest brush, and that it is free from disagreeable odor. The company are temporarily making a special offer of the tank in connection with the sales of the varnish and paint remover.

The Triumph Fruit Jar Holder and Fruit Can Wrench.

The Forbes Chocolate Company, 229 Sheriff street, Cleveland, Ohio, are offering the fruit jar holder and can wrench which are illustrated herewith. These are termed by the company the Triumph Twins. The fruit can



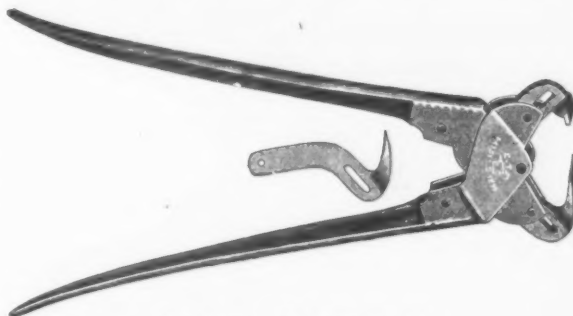
The Triumph Fruit Jar Holder and Fruit Can Wrench.

wrench has already been illustrated in our columns, but is here shown in connection with the holder. The advantages of the jar holder are referred to as follows: That it is adjustable to pints, quarts and half-gallon jars; that it may be used as a jar lifter for handling

hot fruit cans, as well as a holder when tightening or loosening the covers; that it works as a wrench for removing Canadian covers and Mason's improved tops, used in New York and the New England States, and that it may be used in removing covers varying in diameter from 2½ to 4¾ inches. The Twins are designed to retail at 50 cents per pair.

Giant Hoof Parer.

Champion Tool Company, Conneaut Lake, Pa., have brought out the Giant hoof parer No. 52, here shown. Some of its strong characteristics are that when the jaws are wide open, 1¾ inches, the handle movement is only 5½ inches extreme, thus making it possible to work them advantageously with one hand and cut straight into the hoof instead of in a circle as com-



Champion Hoof Parer No. 52.

monly done. The construction is such that the device cuts rapidly at first, then gradually, the leverage increasing as the hard shell of the hoof is reached. The four parts of the tool are interchangeable and can be replaced if occasion requires. Attention is also drawn to the graceful lines and attractive appearance of the parer, the weight of which is but 2 pounds. The wear of the knife is taken up by a set screw between the handles, which is not shown in the cut.

The Barrett Automobile Jack No. 00.

The accompanying cut represents an automobile jack offered by the Duff Mfg. Company, Allegheny, Pa. The jack is built on the lines of the larger size Barrett jacks and has the same working principle. It has a lifting capacity of 1 ton, and the point is made that in construction nothing but the best grade of materials and highest quality of workmanship are employed. Its height, length of rise and curved top are designed to meet automobile requirements. It weighs 8½ pounds,



The Barrett Automobile Jack.

so that it may be easily carried and operated. The foot lift enables the jack to grapple low set loads with facility. The load is raised on both upward and downward strokes of the lever. The load is lowered in the same manner by turning the eccentric—or thumb screw—at the side. The manufacturers state that this is the only jack of its kind with a lowering appliance, and that it will operate at any angle.

Shomee and Pullmee Cork Pullers.

Manning, Bowman & Co., Meriden, Conn., have recently put on the market several new cork pulling devices, of which those here shown are examples. Fig. 1 illustrates the Shomee No. 30 cork puller, with clamp to fasten it to table, counter or shelf, it also being made in style 31, with screw back instead of clamp. With this puller the screw can be instantly adjusted for either long or short corks. The short cork adjustment will pull a long cork, or *vice versa*. The only difference in the operation is that the short cork adjustment does not pull a long cork far enough to top to be as easily re-

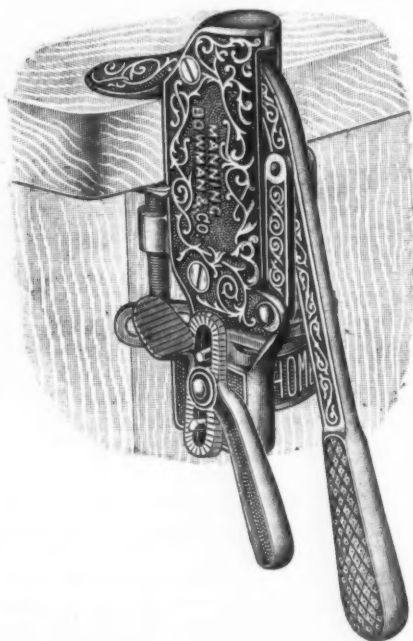


Fig. 1.—Shomee Cork Puller No. 30.

moved. The long cork adjustment pulls a short cork free from the neck of bottle, the cork dropping off when bottle is removed from the bottle grasp. The advantage claimed for this construction is that as the cork need not be entirely removed, the contents are not injured by exposure to the atmosphere, but can be used at will, while where the contents are wanted immediately the machine can be made to quickly give the proper service. The inside is simple, it being possible to take apart and reassemble the parts in five minutes. It is so made that when the lever is raised the worm locks in the cork, which must come out when the lever descends. The bottle grasp attachment is very sensitive to the touch, and the user has the bottle under complete control all the time. The lever is in line with the bottle, forcing the screw to enter the cork direct and avoiding all friction, except that of entering the cork. Fig. 2 shows the Pullmee cork puller No. 35, which has the

Perfect Picture Hanger and Adjuster.

I. H. Solomon, 48 Centre street, New York, is the manufacturer of the Perfect picture hanger and adjuster, here illustrated. A set for one frame consists of two formed strips of specially rolled steel, $\frac{3}{8}$ x 3-32 inch, copper plated and lacquered. Each of the two hangers is held securely in place by three screws. The hanger is really divided into two parts, the lower portion carrying a slide, to which one end of the picture wire is permanently twisted, while the upper portion provides a runway for a slide with flat spring lock having a perforated piece of metal, eyeletted with an



Fig. 2.—Pullmee Cork Puller No. 35.

antifriction metal, through which the picture wire runs to the picture nail or hook. The lower slide has a lever, marked L or R, according to whether designed for left or right side of frame, so that there is an adjustment for height of from 4 to 6 inches, according to size, after the wires are attached. For the average picture hung from a nail or molding well up toward the ceiling the hanger can be properly placed by driving the intermediate screw A 1 inch below the center of the picture—that is, if a picture is 40 inches from top to bottom the screw is placed 21 inches below the top, the end screws being put in afterward. Where pictures are hung from low nails or moldings with only a few inches of wire above the top of frame the hangers can be dropped a few inches lower to give opportunity for tilting. With this hanger it is only necessary to get the height of picture approximately correct, the adjustment afterward being made up or down or tilted forward or back almost



Perfect Picture Hanger and Adjuster.

same interior construction as the Shomee, except that it does not have the adjustment for long and short corks; all corks being drawn free from bottle. Both pullers can be furnished with crown cork attachments, if so ordered, that for the Shomee pattern being numbered 30 C. A. and for the Pullmee 35 C. A. Both pullers have bottle grasps and are finished in nickel.

John M. Cox Hardware Company, Colorado Springs, Col., have been succeeded by Houston Lumber & Hardware Company. It is intended, to make important changes in the arrangement of the store with a view to making it one of the most attractive and convenient in Colorado Springs.

instantaneously by moving the upper slide downward to tilt outward or up to have it hang nearer the wall, thus making it possible to tilt the picture at any time to meet changing conditions of light without altering hanger or wire. The hangers are numbered 6, 8, 10, 12 and 15, the numbers also indicating the number of inches the slide B will traverse between the screw A and the top, the entire lengths over all being respectively 12, 14, 16, 18 and 22 inches. Special sizes other than those named, which are regularly carried in stock, can be made to order, although those mentioned will answer for most pictures. This hanger is patented in the United States, Canada and principal European countries.